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ARMY MEDICAL DEPARTMENT

REPORTS

FOR THE YEAR 1871.

VOLUME XIII.

Presented to both Houses of Parliament by Command of Her Majesty.

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Part of Vol. III, 1873

TO THE RIGHT HONOURABLE
THE SECRETARY OF STATE FOR WAR.

SIR,

IN accordance with instructions laid down for the conduct of business by the Director-General and Heads of Branches of the Army Medical Department, I have the honour to submit the accompanying Report on the Health of the Army in 1871, and on various matters connected with the duties of the Officers of the Department.

The Statistical Report has been drawn up by Deputy Surgeon-General Balfour, F.R.S. The Sanitary Report has been prepared under the direction of Surgeon-General Muir, C.B., and the Medical under that of Deputy Surgeon-General Rutherford, C.B.

I have the honour to be,

SIR,

Your most obedient

Humble Servant,

T. G. LOGAN,

Director-General.

ARMY MEDICAL DEPARTMENT,
April 1873.

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Page	22, Cavalry Dépôt, <i>dele</i> 94 and 149-68.
"	" Infantry Dépôt, <i>dele</i> 1,009 and 130-46.
"	" Total <i>for</i> 1,103 <i>read</i> 344.
"	" " <i>for</i> 131-91 <i>read</i> 41-14.
"	44, Line 20, <i>for</i> published <i>read</i> prepared.
"	37, Table, Infantry Regiments, <i>for</i> 41-69 <i>read</i> 83-70.
"	" " " " 15-21 " 12-30.
"	" " " " 21-52 " 17-39.
"	135, Table, <i>for</i> 1860 <i>read</i> 1869.
"	146, " Delhi, <i>for</i> 30-05 <i>read</i> 32-05.
"	" " Umritsur, <i>for</i> 21-56 <i>read</i> 66-07.

ARMY MEDICAL DEPARTMENT REPORT FOR 1871.

I.—ON THE HEALTH OF THE TROOPS SERVING IN THE UNITED KINGDOM IN 1871.

Section I.

Sickness and Mortality.

STATISTICAL REPORT.

The average strength of the non-commissioned officers and men employed in the United Kingdom during the 52 weeks ending 27th December 1871, as shown by the weekly Returns of sick, was 92,667; the admissions into hospital among them amounted to 75,641, the deaths to 764, and the average constantly non-effective from sickness to 3,594. The admissions, therefore, were in the ratio of 816, the deaths of 8·24, and the mean daily sick of 38·78 per 1,000 of mean strength. The average number of men detached from their Corps and not included in the weekly sick Returns, appears by the Adjutant-General's Returns to have been 6,694, and the deaths among them were 92. The average strength, therefore, of the whole force was 99,331, and the deaths were 856, or in the ratio of 8·62 per 1,000. The ratio of admissions was very slightly in excess of the preceding year, while the deaths show a decrease of ·87 per 1,000.

The following Table shows the sickness and mortality in 1871, compared with the average of the preceding ten years :—

				Ratio per 1,000 of Mean Strength.		
				Admitted into Hospital.	Died.	Constantly Sick.
1871..	..	..	..	816	8·62	38·78
1861-70	..	..	..	913	9·45	46·01

Compared with the results for 1870 there has been a very slight increase in the admissions and mean daily sick, but a decrease in the deaths; they have all, however, been considerably under the average of the last ten years.

The following Table shows the influence of the different classes of diseases in causing the sickness and mortality :—

United
Kingdom.

Orders.	Average Strength in Weekly Returns, 92,667.	Admitted into Hospital	Died.			Ratio per 1,000 of Mean Strength—			
			With the Regiment.	Absent from the Regiment.	Total.	1871.		1869-70.	
						Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile Group ..	5,204	75	13	88	56.2	.89	55.6	.33
2	Constitutional, ..	13,404	235	31	266	144.6	2.68	165.6	3.34
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	989	48	12	60	10.7	.61	11.1	.57
2	Eye	1,397	..	..	..	15.1	..	15.3	..
3	Ear	328	..	..	..	3.5	..	3.5	..
4	Nose	38	..	..	..	.4	..	.3	..
5	Circulatory System ..	1,016	138	10	148	11.0	1.49	11.5	1.62
6	Absorbent	1,252	..	..	..	13.5	..	12.7	.01
7	Ductless Glands ..	9	..	..	..	.1	..	.1	.01
8	Respiratory System ..	8,072	110	5	115	87.1	1.16	78.8	1.32
9	Digestive	9,338	49	4	53	100.8	.53	95.4	.56
10	Urinary	11,351	24	1	25	122.6	.25	115.3	.32
11	Generative	1,188	1	..	1	12.8	.01	12.8	.01
12	Organs of Locomotion	482	5	..	5	5.2	.05	4.8	.06
13	Cellular Tissue ..	2,011	..	..	..	21.6	..	21.2	.03
14	Cutaneous System ..	9,509	..	..	..	102.6	..	96.1	..
	III. Conditions, &c.								
	Debility	393	..	1	1	4.2	.01	3.6	.01
	IV. Poisons	197	8	2	10	2.1	.10	2.9	.11
	V. Injuries.								
2	Accidental Injuries ..	9,326	45	9	54	100.6	.54	94.4	.54
3	Homicidal	3	1	..	1	} .3	{ .01 .27 ..	} .3	{ .03 .36 .01
4	Self-inflicted	21	25	2	27				
6	Judicial	1	..	..	..	
	VI. Surgical Operations	20	..	..	..	.2	..	.1	.01
	Not known .. ..	..	..	2	2	..	.02	..	..
	No Appreciable Disease	92	..	..	..	1.0	..	1.1	..
	Total	75,641	764	92	856	816.2	8.62	803.0	9.45

There has been a decrease in the ratio of admissions by both groups of GENERAL DISEASES, and in that of the deaths also by the constitutional group. This reduction in the admissions has been to some extent counterbalanced by an increase in diseases of the urinary and cutaneous systems, and in accidental injuries. The fluctuation in the other classes of diseases has been very slight.

The following Tables show the relative prevalence of sickness and mortality at the different groups of stations, classified as in the preceding Report:—

* For obvious reasons the ratio of admissions into hospital has been calculated upon the first, and of deaths upon the second, of these numbers.

REPORT FOR 1871.

3

*United
Kingdom.*

	Average Strength.	Admitted into Hospital.	Died.	Average constantly Sick.
1. Seaport Towns	15,340	11,739	132	570
2. Dockyards and Arsenals ..	12,237	11,873	95	553
3. Camps	26,476	21,059	197	955
4. Large Manufacturing Towns ..	5,125	4,419	59	231
5. London and Windsor	5,328	4,020	44	243
6. Dublin	4,638	3,853	58	208
7. Remaining Stations	23,523	18,678	179	834
8. Detached from their Corps ..	6,664	..	92	..
Total	99,381	75,641	856	3,594

	Ratio per 1,000 of Strength.					
	1871.			1870*.		
	Admitted into Hospital.	Died.	Con- stantly Sick.	Admitted into Hospital.	Died.	Con- stantly Sick.
1. Seaport Towns	765	8·60	37·15	783	9·84	38·32
2. Dockyards and Arsenals ..	970	7·76	45·19	901	8·75	41·59
3. Camps	795	7·44	36·07	835	8·73	37·70
4. Large Manufacturing Towns ..	862	11·51	45·07	816	8·17	37·68
5. London and Windsor	755	8·26	45·61	671	9·13	40·64
6. Dublin	831	12·50	44·84	803	12·90	45·38
7. Remaining Stations	794	7·61	35·45	785	9·09	35·87
8. Men detached from their Corps	} ..	13·80	..	..	12·04	..
Total	816	8·62	38·73	809	9·43	38·40

Compared with the results for 1870, there was a reduction in the admissions at the Seaport Towns and Camps, and an increase at all the other groups, most marked at London and Windsor, but also considerable at the Dockyards and Arsenals. The mean daily sick follows the same rule as the admissions, except at Dublin and the Remaining Stations, which show a slight decrease instead of an increase. The mortality was lower than in 1870 at all the groups, except the Manufacturing Towns and among the men detached from their corps.

The admissions and deaths by the various classes of diseases at the different groups of stations, are shown in the following Table :—

* The abolition of the Depot Battalions in 1869 involved the necessity of a redistribution in 1870 of the stations grouped together in this Table. It has been deemed advisable, instead of comparing the results for the year under review with those of the preceding ten years, to confine the comparison to the results of 1870 alone, with a view to greater accuracy, as the same stations are included in each group for the two years.

Order.	Groups of Stations	Seaports.	Dockyards and Arenals.	Camps.		Manufacturing Towns.		London and Windsor.		Dublin.		Remaining Stations.		Men detached from their Corps.
				Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	
	Average Strength ...	16,840	12,237	26,476	6,125	6,323	4,638	23,623	6,864					
Diseases.														
I. General Diseases.														
1	Febrile Group...	676	1,044	1,469	21	323	4	293	6	188	8	1,216	20	13
2	Constitutional "	1,786	1,809	3,544	52	894	24	1,188	9	970	17	3,213	49	31
II. Local Diseases.														
1	Nervous System	159	141	300	16	50	2	52	5	54	4	233	10	12
2	Eye	183	161	450	...	91	...	37	...	72	...	403	...	...
3	Ear	61	61	81	...	15	...	5	...	11	...	94	...	...
4	Nose...	4	9	10	...	3	...	4	...	2	...	6	...	...
5	Circulatory System	188	164	358	42	60	11	27	11	24	7	206	27	10
6	Absorbent	135	176	353	...	90	...	59	...	91	...	348	...	...
7	Ductless Glands	...	3	...	...	1	...	1	...	...	...	4	...	...
8	Respiratory System	1,868	1,415	2,301	26	355	12	442	...	396	...	1,795	24	5
9	Digestive	1,366	1,598	2,432	16	438	...	480	...	338	...	2,408	14	4
10	Urinary	2,224	1,741	2,890	7	790	1	485	1	628	3	2,603	3	1
11	Generative	192	171	371	...	68	...	41	...	66	...	279	1	...
12	Organs of Locomotion	89	67	146	1	25	1	28	...	20	...	107	1	...
13	Cellular Tissue	324	347	532	...	68	...	161	...	77	...	502	...	...
14	Cutaneous System	1,464	1,188	2,890	...	612	...	283	...	536	...	2,646	...	...
III. Conditions, &c.														
IV. Poisons														
V. Injuries.														
2	Accidental	1,403	1,324	2,753	7	522	3	410	2	338	2	2,576	16	9
3	Homicidal	1	3	...	...	...	...	...	...	...	...	2	1	...
4	Self-inflicted	3	2	4	5	2	1	2	...	1	3	6	10	2
5	Judicial	...	1	...	...	...	...	...	...	...	...	...	...	...
VI. Surgical Operations														
No Appreciable Disease														
Cause unknown														
Total														
		11,759	11,573	21,059	197	4,419	59	4,020	44	3,833	58	18,678	179	92

REPORT FOR 1871.

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United Kingdom.

Ratio per 1,000 of Mean Strength.

Orders.	Groups and Stations	Seaports.	Dockyards and Arenals.		Camps.		Manufacturing Towns.		London and Windeor.		Dublin.		Remaining Stations.		Men detached from their Corps.	
			Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1	Diseases.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2																
3	I. General Diseases.															
4	Febrile Group	44.1	85.3	72	55.5	79	64.0	78	53.1	1.12	40.5	1.73	51.7	85	1.95	1.95
5	Constitutional "	116.5	147.8	2.87	133.9	1.96	174.4	4.88	223.0	1.69	209.1	3.66	136.6	2.08	4.65	4.65
6	II. Local Diseases.															
7	Diseases of the—															
8	Nervous System...	10.4	11.5	.68	11.3	.66	9.7	.39	9.8	.94	11.6	.86	9.9	.43	1.80	1.80
9	Eye	11.9	13.2	...	17.0	...	17.8	...	6.9	...	15.5	...	17.1	...	...	...
10	Ear	4.0	5.0	...	3.1	...	2.9	...	7	...	2.4	...	4.0	...	...	...
11	Nose	4.3	5.7	...	3.4	...	2.6	...	7	...	2.4	...	3.3	...	...	...
12	Alimentary System	12.2	13.4	1.50	13.5	1.58	9.7	2.14	5.1	2.06	5.2	1.50	8.7	1.15	1.60	1.60
13	Circulatory System	8.6	14.4	...	13.3	...	17.6	...	11.1	...	19.6	...	14.8	...	...	...
14	Respiratory System	89.2	115.7	1.11	86.9	.98	69.3	2.34	83.0	1.50	85.4	2.16	76.3	1.02	7.75	7.75
15	Digestive "	88.4	115.1	.46	91.9	.30	83.1	...	90.1	.33	72.9	.38	102.5	.69	69	69
16	Urinary "	145.0	142.4	.82	109.8	.28	184.1	.20	91.0	.19	135.4	.65	110.6	.15	16	16
17	Genital "	12.5	15.8	...	14.0	...	13.3	...	7.7	...	14.2	...	11.8	...	...	...
18	Organs of Locomotion	15.8	23.3	.13	20.1	.03	4.9	...	5.2	...	4.3	...	4.5	.01	...	...
19	Cellular Tissues	21.1	29.3	...	20.1	...	13.3	.20	30.2	...	16.6	...	21.3	...	...	...
20	Cutaneous System	95.4	97.1	...	109.8	...	119.4	...	53.1	...	115.6	...	108.2	...	...	...
21	III. Conditions, &c.															
22	Debility	5.1	6.2	...	4.3	...	3.7	...	3.6	...	5.6	...	2.5	...	.15	.15
23	IV. Poisons	1.8	2.3	...	2.2	.15	1.2	...	2.1	...	2.4	...	2.3	.13	.30	.30
24	V. Injuries.															
25	Accidental	91.4	108.3	.65	104.0	.26	101.8	.58	76.9	.38	72.9	.43	109.5	.68	1.35	1.35
26	Homicidal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
27	Self-inflicted	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28	Judicial	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29	VI. Surgical Operations	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
30	No Appreciable Cause	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
31	Unknown	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32	Total	765.2	970.3	8.90	786.4	7.44	882.2	11.51	754.5	8.26	830.7	12.50	794.0	7.61	13.90	13.90

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GENERAL DISEASES.—There was an increase in the prevalence of the febrile group in London and Windsor, Dublin, and the large Manufacturing Towns, and of the constitutional group in the Dockyards and Arsenals, and in London and Windsor. At all the other groups of stations there was a decrease upon the results of the preceding year. The Dockyards and Arsenals furnished the highest ratio of admissions by febrile, and London and Windsor by constitutional diseases. The following Table shows the admissions and deaths by the principal diseases in this class:—

General Diseases.		Annual Ratio per 1,000 of Mean Strength.							
		Seaport Towns.	Dockyards and Arsenals.	Camps.	Large Manufacturing Towns.	London and Windsor.	Dublin.	Remaining Stations.	Men Detached.
<i>Febrile.</i>									
Eruptive Fevers ..	Admitted	9·2	11·2	4·0	7·0	14·3	12·1	6·0	..
	Died ..	·39	..	·26	·19	·75	·64	·25	1·05
Continued Fevers ..	Admitted	14·7	29·7	28·1	19·3	20·8	19·0	20·2	..
	Died ..	·13	·33	·45	·40	·19	·87	·47	·45
Paroxysmal Fevers ..	Admitted	9·5	27·0	11·7	7·8	·7	3·6	12·4	..
	Died ..	..	..	..	..	..	·22	..	..
Influenza ..	Admitted	5·7	11·8	6·2	22·1	12·0	2·8	7·9	..
	Died ..	..	..	..	..	..	..	..	..
Erysipelas ..	Admitted	2·9	3·6	1·9	4·9	2·3	1·1	3·2	..
	Died ..	·07	·08	·04	..	..	..	·13	·45
Other Febrile Affections ..	Admitted	2·1	2·0	3·5	2·9	3·0	1·9	2·0	..
	Died ..	·13	..	·04	·19	·19	..	..	..
<i>Constitutional.</i>									
Rheumatism	Admitted	40·8	62·2	49·0	44·1	44·1	38·6	41·2	..
	Died ..	·13	..	..	·40	..	..	..	·15
Syphilis ..	Admitted	61·4	71·1	71·3	165·0	165·8	157·2	83·0	..
	Died ..	·07	·08	·07	..	·19	..	·08	..
Scrofula, Phtisis, &c.	Admitted	12·3	11·7	11·2	10·3	10·3	11·0	9·7	..
	Died ..	2·48	3·11	1·78	4·09	1·50	3·66	1·92	4·50
Scurvy and Purpura ..	Admitted	·2	·2	·2	·5	·5	·2	·3	..
	Died ..	..	..	..	..	..	..	..	..
Anæmia ..	Admitted	1·0	1·7	1·1	·7	·7	·2	1·5	..
	Died ..	..	..	..	..	..	..	..	..
Other Constitutional Affections ..	Admitted	·8	·9	1·1	2·3	2·3	1·9	·9	..
	Died ..	·19	·08	·11	·19	..	..	·08	..

Eruptive Fevers were much more prevalent than in 1870 at all the groups of stations, except the Camps. The excess was almost entirely due to small-pox, which prevailed so generally throughout the year as an epidemic among the civil population. The troops in the Camps did not escape it, but there was a reduction in the admissions by eruptive fevers compared with the preceding year, chiefly from the abatement of measles and scarlet fever, which had then prevailed epidemically.

Small-pox prevailed throughout the year; the greatest number of admissions occurred in the first and the smallest in the third quarter. The following was the number of cases admitted into hospital in each quarter:—

1st Quarter	...	71	3rd Quarter	...	19
2nd "	...	61	4th "	...	62

London and Windsor furnished the greatest number of cases; they amounted

to 40, and all but 4 occurred in the first quarter. The other stations at which the disease prevailed to a considerable extent among the troops were Woolwich, Aldershot, Warley, Devonport, Weymouth, Newcastle, and Dublin. There were altogether 213 cases admitted into hospital, of which 19 died, or 9 per cent. Besides these, 5 deaths occurred among men detached from their corps, and consequently not admitted into military hospitals. The admissions amounted to 2·3 per 1,000 of mean strength, and the deaths to ·24 per 1,000, including detached men. The cases are all stated to have borne marks of vaccination, except one recruit who had just joined.

Scarlet fever prevailed to some extent at Devonport, Cork, and Woolwich, and measles at Woolwich, Warley, London, Dublin, and Belfast, but gave rise to very little mortality, there having been only 8 deaths in 208 cases of the former and none in 143 of the latter. One death was caused by each among the men detached from their corps.

Continued Fevers did not differ greatly from the results of the preceding year. There was an increase in the admissions at the Dockyards and Arsenals and the Camps, chiefly in cases of febricula, and a slight decrease at the other groups of stations. Enteric fever was more prevalent and fatal than in 1870 at the Camps and Remaining Stations; the excess at the former was chiefly at Aldershot, which furnished 28 cases and 7 deaths, and at the latter at Mullingar, where there were 18 cases admitted, but only 2 deaths. Four cases of cerebro-spinal fever were reported, one at Dover which recovered, and 3 at der-shot, all of which proved fatal.

Paroxysmal Fevers were less prevalent at all the groups of stations, except the large Manufacturing Towns and London and Windsor; the Dockyards and Arsenals as usual furnished the highest proportion of cases. The relative prevalence of these fevers at the different stations depends chiefly on the previous service of the corps doing duty at them, as they are almost always the result of liability contracted in the Tropics. Sheerness is the principal exception to this rule, a considerable number of first attacks being furnished by the detachment at the Isle of Grain; the detachment at Tilbury Fort from Chatham also occasionally furnishes cases.

Rheumatism.—There has been a decrease upon the results for 1870 in the admissions by this disease at the Seaport Towns; the ratio has been identical in the two years at Dublin and the Remaining Stations; and there has been an increase at the other four groups.

Syphilis was more prevalent than in 1870 at the Dockyards and Arsenals and in the large Manufacturing Towns; there was no change in the amount at London and Windsor, and there was a decrease in all the other groups. The result for the whole of the troops serving at home has been a reduction of 12·6 per 1,000 of the strength, of which 8·2 was in the Primary and 4·4 in the Secondary forms of Syphilis. The large Manufacturing Towns, London and Windsor, and Dublin, furnished more than double the average of the other groups of stations.

The ratio of admissions into hospital for primary venereal sores per 1,000 of mean strength at all the large stations in the United Kingdom during the last 5 years, is shown in the following Table:—

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Stations.	Admissions into Hospital per 1,000 of Mean Strength for Primary Venereal Sores in				
	1867.	1868.	1869.	1870.	1871.
Devonport and Plymouth	78	66	74	58	50
Portsmouth	116	86	62	51	41
Chatham and Sheerness	71	63	41	47	65
Woolwich	88	46	52	43	58
Aldershot	81	77	63	67	65
Windsor	58	136	93	67	78
Shorncliffe	42	77	60	100	30
Colchester	145	182	85	42	32
Winchester	52	104	101	61	29
Dover	132	111	80	30	24
Canterbury	119	114	45	152	38
Maidstone	242	122	128	68	44
Cork	72	61	73	68	55
Curragh	104	85	88	56	35
Isle of Wight	59	103	129	64	66
London	163	148	144	160	190
Warley	74	92	61	55	57
Hounslow	62	106	85	88	45
Pembroke Dock	28	35	51	54	28
Sheffield	163	107	146	77	126
Manchester	177	115	160	92	70
Preston	87	87	172	134	75
Edinburgh	63	46	60	99	69
Fermoy	70	47	116	89	83
Limerick	117	114	54	136	57
Athlone	85	38	42	44	47
Dublin	129	139	180	128	117
Belfast	89	56	52	43	61

This Table shows an increase, during the year under review, on the proportion in 1870, in the admissions by primary venereal sores at Chatham and Sheerness and at Windsor, and a decrease at all the other stations under the operation of the Contagious Diseases Act—those above the line. The reduction was very trifling at Aldershot, and very marked at Shorncliffe and Canterbury. The increase at Windsor was mainly owing to the movements of the troops in the third quarter of the year in connection with the Autumn Manœuvres.

Of the stations not under the Act, London, the Isle of Wight, Warley, Sheffield, Athlone, and Belfast, show an increase in the admissions, while there has been a decrease at all the other stations. London continues to furnish the highest proportion of cases; the ratio is also still very high in Dublin, being exceeded only by London and Sheffield. Taking the average of all the stations, the ratio of admissions for primary venereal sores during the year was 50·6 per 1,000 of mean strength at the stations under the operation of the Contagious Diseases Act, and 93·4 at those not under the Act.

The question of the results of the operation of the Contagious Diseases Act has excited considerable public interest. With a view to show these numerically, the following Tables have been compiled. The first Table shows the prevalence of primary venereal sores and of gonorrhœa at the 28 largest garrisons in the United Kingdom in 1864 (the year in which the first Contagious Diseases Act was passed, but before it came into operation), and in 1871 at the same stations subdivided into those at which the Act was and those at which it was not in operation.

	Act in operation.		Act not in operation.	
	Ratio per 1,000 admitted for		Ratio per 1,000 admitted for	
	Primary Venereal Sores.	Gonorrhœa.	Primary Venereal Sores.	Gonorrhœa.
1864 .. ..	..	..	108·6	112·5
1871	52·0	115·6	93·4	107·4

Comparing, therefore, the results at stations where the Act was in operation with those of the year previous to the first Act being applied, the decrease in primary venereal sores has been 56·6 per 1,000; or contrasted with the results in 1871 at stations not under the Act, it has been 41·4 per 1,000. But as objection may be taken to deductions drawn from so limited a period of time as one year, the following Table has been framed to show the average results of seven years at the stations under the Act, contrasted with the average of the same years at those not under the Act:—

Average of Seven Years. Period 1865-71.	Average Annual Strength.	Average Annual Admissions for		Ratio per 1,000 of Mean Strength admitted for	
		Primary Venereal Sores.	Gonorrhœa.	Primary Venereal Sores.	Gonorrhœa.
Stations under the Act	28,202	1,841	3,318	65·3	117·7
Stations not under the Act	34,325	3,481	3,858	101·4	112·4

This Table shows that the admissions for primary venereal sores, or that form of disease which is likely to produce constitutional deterioration, were, on the average of the seven years, 36·1 per 1,000 of mean strength less annually at the stations under than at those not under the Act. Perhaps the fairest estimate of the benefit derived by the Army from the Acts is to be found in the difference between the admissions at the stations under the Act in 1871 and the average of them during the seven years at the stations not under the Act, amounting to 49·4 per 1,000 of the strength.

Scrofula and Phthisis.—The ratio of admissions into hospital was lower than in 1870 at all the groups of stations except the Camps, at which it remained unchanged. When the numbers are so small as the deaths by these diseases, considerable fluctuations must naturally occur in the different stations, but the mortality for the whole of the groups was ·73 per 1,000 lower than in the preceding year.

LOCAL DISEASES.—There has been no very marked difference in these diseases, with the exception of a considerable increase in those of the *urinary system* at all the groups of stations, except the Camps and Remaining Stations, where the increase has taken place only to a trifling extent. The excess has been due chiefly to gonorrhœa, which, on the average of all the stations, shows an increase of 14 per 1,000 upon the amount in 1870. On comparing the relative prevalence of gonorrhœa at the stations under the Contagious Diseases Act, and at the large stations not under the Act, the ratio of admissions at the former was 116, and at the latter 107 per 1,000. There was an increase at both, compared with the results of the preceding year, but greater at the stations under the Act. These results, combined with those on a preceding page as to the prevalence of syphilis, tend to confirm the opinion expressed in 1869, that “the benefit of the Act would appear” to be confined to primary venereal sores, or that form of venereal disease

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"which is likely to be followed by constitutional effects, while it exercises "no influence in the reduction of gonorrhoea."*

INJURIES differed little from the results of the preceding year, and the proportion of deaths by suicide in the two years was identical. The modes of committing suicide were as follows:—9 by gunshot, 7 by cut-throat, 3 by drowning, 2 by hanging, 1 by throwing himself out of a window, 1 by placing himself in the way of a railway train, 1 not stated, the man being absent from his corps, and 3 by poison, viz., 1 by arsenic, 1 by cyanide of potassium, and 1 by oxalic acid.

CAUSE OF DEATH UNKNOWN.—It has been found necessary to include two deaths under this heading, both of which occurred on furlough. A bombardier of the 4th Brigade Royal Artillery died on board a steamer while proceeding on furlough from Cork to Plymouth, and a private of the 2nd Battalion 7th Regiment died suddenly at Bury while on furlough. In each instance an inquest was held; the Jury returned, and the Coroner was content to receive, a verdict of "Died from natural causes!"

The following Table shows the sickness, mortality, and invaliding in the different arms of the service, those corps only being included which were in the United Kingdom during the whole of the year:—

	Average Strength.	Admitted into Hospital.	Died in and out of Hospital.	Discharged as Invalids.	Annual Ratio per 1,000 of Strength.			1861-70. Annual Ratio per 1,000.		
					Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Household Cavalry	1,204	802	9	12	666	7·47	9·96	618	8·39	16·28
Dragoon Guards & Dragoons ..	10,462	7,690	94	193	735	8·98	18·45	842	6·78	30·74
Royal Artillery ..	12,123	12,109	107	363	999	8·82	29·94	900	8·16	†31·12
Royal Engineers ..	3,568	..	21	54	..	5·88	15·19	..	6·92	..
Foot Guards ..	6,222	4,143	52	136	666	8·36	21·85	787	7·90	27·45
Infantry Regts. ..	47,420	34,237	385	838	722	8·11	17·67	784	7·70	29·85
Army Hosp. Corps	649	..	10	20	..	15·40	30·81	..	..	..
Army Service ..	2,412	..	31	25	..	12·85	10·35	..	..	..
Depôt Brig., R.A..	2,280	2,788	15	67	1,223	6·58	29·39	1,071	9·86	†23·08
Coast Brig., R.A..	1,554	..	38	15	..	24·45	9·65	..	17·65	8·55
Depôts ..	7,431	5,469	68	283	736	9·15	38·08	938	11·03	43·14

Compared with the results for 1870 there has been an increase in the proportion of admissions in all the arms, except the Depôts, which show a

* "Army Medical Department Report for 1869," Vol. XI., Appendix No. VI., page 310.

† The average of six years, 1865-70, as prior to 1865 it was impossible to separate the Invalids of the Brigades serving at Home from those of the Depôt Brigade.

decrease. There has been an increase in the deaths in the Cavalry of the Line, Royal Artillery, Infantry Regiments, Coast Brigade of Royal Artillery and Army Service Corps, and a decrease in all the others; and there has been a decrease in the invaliding in all except the Army Hospital Corps and the Depôt and Coast Brigades Royal Artillery. If the comparison be made with the average of the last ten years there will be found an increase in the admissions in the Household Cavalry, Royal Artillery, and Depôt Brigade Royal Artillery, and in the deaths, in Cavalry of the Line, Royal Artillery, Foot Guards, Infantry Regiments, and Coast Brigade Royal Artillery. There has been a decrease in the invaliding from all the arms except the Depôt and Coast Brigades Royal Artillery.

On adding to the strength one-half of the number of men placed on the pension list during the year, and to the mortality the deaths which occurred among them between the date of their discharge and the 31st December, as shown in a return obtained from the War Office, the following results are obtained:—

	1871.			1861-70.
	Average Strength corrected as above.	Deaths of Soldiers and Pensioners.	Ratio of Deaths per 1,000 of Strength.	Ratio of Deaths of Soldiers and Pensioners per 1,000 of Strength.
Household Cavalry	1,227	11	8·96	10·40
Cavalry of the Line	10,591	102	9·63	7·88
Royal Artillery	12,348	123	9·96	9·18
Foot Guards	6,305	61	9·67	10·40
Infantry Regiments	47,901	441	9·21	9·06

Compared with the preceding year there has been a slight increase in the mortality of the Royal Artillery, and a decrease in all the other arms, most marked in the Household Brigade. Compared with the average of the preceding ten years the ratio in 1871 was higher in all the arms except the Household Troops, the excess being greatest in the Cavalry of the Line. The difference in the mortality of the different arms did not exceed one per 1,000, the Household Cavalry being lowest and the Royal Artillery highest.

The admissions, deaths, and invaliding by the different classes of diseases are shown for each arm of the service in the following Table, framed from Abstract No. 1 in the Appendix:—

Orders.	Diseases.	Household Cavalry.		Cavalry.		Royal Artillery.		Foot Guards.		Infantry Regiments.		Depôts Brigade Royal Artillery.		Depôts.		Royal Engineers.		Coast Brigade, R. A.		Army Hospital Corps.		Army Service Corps.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Strength	1,204	10,462	12,123	6,222	47,420	2,280	7,431	3,568	1,554	649	2,412											
1	I. General Diseases.																						
2	Febile Group	22	156	763	2	337	9	1,230	14	49	1	1	1	384	4	3	5	1	19	2	4	4	1
3	Constitutional " ..	156	1,449	1,973	33	1,230	14	1,230	14	49	1	1	1	998	26	5	19	19	6	7	11	5	
4	II. Local Diseases.																						
5	Nervous System ..	12	117	161	4	59	3	31	9	2	1	6	1	79	6	4	7	1	1	..	..	3
6	Eye	7	94	162	7	38	..	7	..	3	..	..	..	108	..	..	..	..	..	..	..	2
7	Ear	1	19	50	..	7	..	7	..	12	..	..	..	25	..	..	..	..	..	..	..	1
8	Nose	2	8	6	..	2	..	2	..	15	..	..	..	1	..	..	..	..	..	..	..	..
9	Circulatory System ..	12	77	194	27	62	..	18	9	53	..	12	..	92	10	5	8	8	1	2	6	7	
10	Absorbent " ..	12	166	177	..	..	..	62	..	603	..	84	..	61	2	..	..	..	..	..	..	..
11	Ductless Glands ..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..
12	Respiratory System ..	97	664	1,356	13	417	10	19	3,965	51	46	335	4	535	8	11	1	6	..	1	2	2	
13	Digestive " ..	184	673	1,560	7	55	449	3	5	4,067	23	69	417	16	764	4	46	1	1	1	1	1	
14	Urinary " ..	63	1,036	2	4	1,956	2	9	592	10	15	446	..	2	907	6	1	2	1	1	2	1	
15	Generative " ..	8	167	196	..	40	..	3	40	528	1	6	..	38	78	..	..	..	..	..	..	3
16	Organs of Locomotion ..	56	53	83	16	24	1	6	209	3	37	12	..	36	4	1	..	..	..	..	..	..
17	Cutaneous Tissue ..	..	212	1	821	1	180	2	521	..	6	49	..	123	..	..	..	..	..	..	..	..
18	III. Conditions, &c.	71	1,266	1,376	9	445	..	..	..	4,096	..	22	297	709	10	..	2	..	..	..	..	..
19	Debility	7	37	45	11	14	..	3	201	..	21	22	..	29	17	..	1	1	4	..	1	4	
20	IV. Poisons	2	18	24	3	11	..	..	86	3	..	9	..	19	1	..	..	..	..	..	1	..
21	V. Injuries.																						
22	Accidental	188	1,232	1,692	8	351	1	9	4,141	27	34	267	..	486	6	9	1	..	..	1	1	..
23	Homicidal .. ..	..	..	..	..	..	..	..	..	8	..	..	..	..	..	..	..	..	..	..	..	..
24	Self-inflicted	1	1	3	7	1	2	1	2	6	8	..	1	..	..	..	..	..	..	..	..	..
25	VI. Surg. Operations ..	..	3	1	1	2	..	1	8	..	2	..	..	8	1	..	..	..	..	1	..	..
26	Causes not ascribed ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	No Appreciable Disease ..	..	4	15	1	..	..	..	..	31	1	..	..	9	..	..	..	..	..	..	..	..
28	Total	892	7,690	12,109	107	4,148	52	186	54,237	385	588	2,783	15	5,493	68	283	51	38	15	10	20	31	25

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General Diseases.			Annual Ratio per 1,000 of Mean Strength.							
			Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery.	Foot Guards.	Infantry Regiments.	Depôt Brigade, Royal Artillery.	Depôts.	Army Service Corps.
<i>Febrile—</i>										
Eruptive Fevers	Admitted	..	5·8	5·7	8·6	13·2	6·5	14·9	4·3	3·0
	Died	..	..	·29	·16	·64	·42	..	·14	..
Continued Fevers	Admitted	..	4·2	19·0	20·1	26·2	21·3	41·2	19·3	23·1
	Died	..	..	·29	..	·48	·51	..	·40	1·66
Paroxysmal Fevers	Admitted	..	..	4·2	20·8	1·1	9·0	43·4	18·8	6·0
	Died	..	..	..	..	..	..	..	..	..
Influenza	Admitted	..	7·5	5·7	7·6	9·3	7·5	14·5	6·2	7·0
	Died	..	..	..	..	..	..	..	..	..
Erysipelas	Admitted	..	·8	1·9	3·7	1·8	2·6	7·5	2·0	3·0
	Died	..	..	..	..	·16	·11	·44	..	..
Other Febrile Diseases	Admitted	..	..	1·5	2·5	2·6	2·4	·9	1·1	4·0
	Died	..	..	·09	..	·16	·04	..	..	..
<i>Constitutional—</i>										
Rheumatism	Admitted	..	43·2	37·1	53·3	37·0	39·3	94·7	52·3	45·7
	Died	..	..	·09	·08	·16	·0	..	..	..
Syphilis	Admitted	..	74·8	90·0	95·9	150·1	66·84	79·4	64·1	67·7
	Died	..	..	..	..	·32	·06	..	·54	..
Scrofula, Phthisis, &c.	Admitted	..	8·3	9·2	11·2	8·4	11·1	7·9	14·8	11·5
	Died	..	2·40	1·72	2·64	1·77	2·30	2·19	2·69	4·56
Scurvy and Purpura..	Admitted	..	..	·5	·2	·6	·2	..	·1	..
	Died	..	..	..	..	..	..	..	..	..
Anæmia	Admitted	..	..	·5	1·2	·6	1·4	1·3	1·6	..
	Died	..	..	..	..	..	..	..	·13	..
Other Constitutional Diseases	Admitted	..	3·3	1·2	1·0	1·0	·9	..	1·4	1·0
	Died	..	..	·09	..	..	·17	..	·13	..

Eruptive Fevers were more prevalent than in 1870 in all the arms of the service except the Depôts and Army Service Corps; the increase was most marked in the Foot Guards; the excess was to a great extent the result of the epidemic of small-pox, which was so prevalent in the civil population. The corps which furnished the highest proportion of this disease were the 2nd and 3rd Battalions Grenadier Guards and the 2nd Battalion Scots Fusilier Guards in London and Dublin, the 21st Brigade Royal Artillery at Woolwich, the 2nd Battalions of the 2nd, 5th, 7th, and 22nd Regiments, and the Depôt of the 73rd Regiment. The 2nd Battalion 11th Regiment returned 13 cases of chicken-pox, but had only one case of small-pox, which terminated fatally. Scarlet fever prevailed to some extent in the 1st Dragoons, the 12th Brigade and 2nd Depôt Brigade Royal Artillery, the 2nd, 22nd, 34th, 57th, and 67th Regiments, and the 72nd Depôt.

Continued Fevers.—The admissions were higher than in 1870 in the Royal Artillery and its Depôt Brigade, Foot Guards, Infantry Regiments, and Army Service Corps, and lower in all the other arms. There was no special prevalence of it in any corps. The 101st Regiment furnished the largest proportion of cases, and the Medical Officer in charge attributed the prevalence to exposure to cold and wet at Aldershot.

There were 80 admissions by enteric fever reported, and 22 deaths; of these 49 cases and 16 deaths occurred in the Infantry. This form of fever

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did not prevail in marked excess in any corps except the 33rd Foot, which had 11 cases and 2 deaths between the 19th July and 27th August in the South Camp at Aldershot, and the Army Service Corps, which had 13 cases and 3 deaths at the same station, 10 of the cases being admitted in the latter half of July. The outbreak of the disease was believed to depend on impure water and a defective state of the surface drains.

Paroxysmal Fevers were less prevalent in all the arms except the Cavalry of the Line, the Foot Guards and the Depot Brigade Royal Artillery. The latter, the Royal Artillery, and the Depôts, furnished the highest proportions. In the Royal Artillery ague was most prevalent in the 1st, 14th, and 21st Brigades; in the Infantry Regiments in the 2nd Battalion 3rd, 1st Battalion 7th, and the 34th Regiments; and in the Depôts, in the 2nd Battalion 12th, 1st Battalion 21st, and 38th Regiments, in all of them the result of previous Indian Service.

Influenza was to a slight extent more prevalent than in 1870 in the Household Brigade, but shows a reduction in all the other arms, particularly in the Depot Brigade Royal Artillery and the Army Service Corps, in which the ratio of admissions was remarkably high in 1870. The Depot Brigade Royal Artillery still had the highest proportion of admissions, but it was only one-seventh of the amount in the preceding year.

Rheumatism has been less prevalent in the Cavalry of the Line; the ratio of admissions in the two years has been identical in the Infantry Regiments, and there has been an increase in all the other arms. Its prevalence has been greatest in the Depot Brigade Royal Artillery and the Depôts of Regiments, probably from the number of old soldiers in them. In the other arms there has been no remarkable excess.

Syphilis.—There has been an increase in the admissions from the Household Cavalry, Royal Artillery, Depot Brigade Royal Artillery, and the Army Service Corps, and a decrease from all the other arms. The Foot Guards have furnished much the highest proportion of cases, and next to them the Royal Artillery. The 3rd Battalion Grenadier Guards, quartered during the whole year in London, had much the largest number of cases, the 2nd Battalion of the same corps and the 2nd of the Coldstream Guards ranking next.

Scrofula, Phthisis, &c.—The admissions by these diseases have been lower than in 1870 in all the arms except the Royal Artillery and the Army Service Corps, and the deaths have been lower in all but the Cavalry of the Line and the Army Service Corps. Nor has this reduction in the mortality been obtained by a greater amount of invaliding, for the only arm in which this has exceeded the proportion in the preceding year has been the Depot Brigade Royal Artillery. The following Table shows the total loss by death and invaliding from these diseases during the year:—

	Loss per 1,000 by			
	Death.	Invaliding.	Death and Invaliding.	
			1871.	1870.
Household Cavalry	2·49	4·98	7·47	14·07
Cavalry of Line	1·72	2·10	3·82	7·08
Royal Artillery	2·64	5·20	7·84	8·26
Foot Guards.. .. .	1·77	4·34	6·11	13·21
Infantry Regiments.. .. .	2·30	4·47	6·77	9·14
Depôt Brigade, Royal Artillery ..	2·19	5·70	7·89	9·60

Thus there has been a decrease in the total loss by these diseases in all the arms, most marked in the Household Brigade, in both arms of which the ratio had previously stood very high, and very marked also in the Cavalry of the Line, the previous ratio of which had been lower than in any other branch of the service.

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LOCAL DISEASES—The admissions by *diseases of the nervous system* did not differ greatly in the different arms, but were rather more numerous in the Artillery and its Depot Brigade than in the other arms. The principal cause of the excess was epilepsy, which gave rise to one-third of the admissions by this class of diseases. The invaliding also was higher in the Artillery than the other arms, and mainly from the same cause.

Diseases of the Circulatory System were, as in former years, more prevalent in the Royal Artillery than in the other arms; the mortality by them was also higher than in any except the Army Service Corps, and the invaliding was more than double that of the other arms with the exception of the Depôts. Valve disease of the heart and palpitation were the most frequent causes of admissions and of invaliding, and valve disease of the heart and aneurism of the aorta of death; varicose veins also gave rise to a considerable share of the invaliding.

Diseases of the respiratory organs were more prevalent than in 1870 in all the arms, except the Cavalry of the Line, in which the results for the two years were identical, and the Depôts, in which there was a marked reduction. The principal cause of admissions in this class was bronchitis.

Diseases of the Digestive System show a decrease except in the Infantry Regiments, in which there was no change, and the Royal Artillery and its Depot Brigade, both of which had a considerable increase, most apparent in cases of tonsillitis and diarrhoea.

Diseases of the Urinary System furnished a higher ratio of admissions than in 1870 in all the arms except the Depôts, in which there was a decrease. The increase was very considerable in the Royal Artillery and its Depot Brigade, which, as in 1870, had much the highest proportion of cases, but was very moderate in the other arms. The excess was due to gonorrhoea, and the decrease in the Depôts occurred in the same disease.

Diseases of the Cutaneous System show a considerable increase in the Royal Artillery, Foot Guards, and Infantry Regiments. In the Foot Guards this was caused by an outbreak of impetigo affecting the head and face in the 2nd Battalion Grenadier Guards quartered in Beggar's Bush Barracks, Dublin. The disease commenced in the end of October, when 91 cases were admitted into hospital in a week. It was speedily checked, but cases continued to occur till the end of the year, the total admissions having amounted to 162 in a strength of 880 men. The excess of the admissions in the Artillery and Infantry was chiefly due to ulcers and itch.

The other classes do not seem to require special notice.

The following Table shows the sickness, mortality, and invaliding in each corps serving at home during the whole of the year :—

Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
1st Life Gds.	402	254	..	1	1	7	631·8	2·49	17·41	<div>Months.</div> <div> <div>London</div> <div>Windsor</div> <div>Windsor</div> <div>London</div> <div>London</div> </div>
2nd „	404	241	1	..	1	2	596·5	2·48	4·95	
R. Horse Gds.	393	307	4	3	7	3	771·4	17·59	7·54	
Total Household Cavalry	1,204	802	5	4	9	12	666·1	7·47	9·96	

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
										Months.
1st Dr. Gds.	481	206	1	..	1	3	428·3	2·08	6·24	Newbridge 7½ Curragh 1½ Dublin 3
2nd „	522	528	1	2	3	11	1011·5	5·75	21·07	Colchester 8 Aldershot 4
3rd „	516	459	4	..	4	10	889·5	7·75	19·38	Aldershot 9 Maidstone 3
4th „	568	275	3	1	4	23	484·1	7·04	49·29	Manchester, with detach. at Liverpool } 12
5th „	565	380	4	2	6	4	672·6	10·62	7·08	Leeds 4½ York 7½
6th „	531	374	6	..	6	7	704·3	11·30	13·18	Dundalk, Belfast, and Belturbet } 7 Dublin 5
7th „	516	373	4	2	6	12	722·9	11·63	23·26	Maidstone, with det. at Shorncliffe and Walmer } 8 Aldershot 1 Norwich, with det. at Ipswich and Colchester } 3
1st Dragoons	580	355	3	2	5	8	612·1	8·62	13·79	Ballincollig and Cork 4½ Curragh 4½ Dundalk 3
2nd „	555	530	3	1	4	10	953·1	7·21	18·02	Longford, with det. Dublin } 3 Edinburgh 1 Brighton, with det. at Shorncliffe } 3½
6th „	521	451	5	1	6	5	865·1	11·52	9·60	On March Head-Quarters at Cahir, with Troops detached } 8 York 4½ On March ½
7th „	511	492	8	..	8	10	962·8	15·66	19·57	Aldershot 7 Dublin 7½ Curragh 4½
8th „	515	362	3	1	4	17	702·9	7·76	33·00	Aldershot 12
9th Lancers	600	486	8	1	9	12	810·0	15·00	20·00	Hounslow, with det. at Hampton Court and Kensington } 8 Aldershot 1 Colchester 3
10th Hussars	638	450	2	2	4	4	705·3	6·27	6·27	

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
12th Lancers	609	388	1	..	1	8	637·1	1·64	13·14	<div> <div> Aldershot Hounslow, with dets. at Hampton Court and Kensington </div> <div> Months. 9 3 </div> </div>
13th Hussars	603	474	9	2	11	6	786·1	18·24	9·95	<div> <div>Edinburgh, &c.</div> <div>Leeds, with det.</div> <div>4 8</div> </div>
14th "	606	317	2	1	3	21	523·1	4·95	34·65	<div> <div>Cahir, with det.</div> <div>Ballincollog, with det.</div> <div>3½ 8½</div> </div>
17th Lancers	507	355	3	1	4	9	700·2	7·89	17·75	<div> <div>Dublin Longford, with det.</div> <div>Curragh</div> <div>3 5</div> </div>
19th Hussars	518	435	5	..	5	8	839·8	9·65	15·44	<div> <div>Canterbury Brighton, with det. at Shorncliffe</div> <div>7</div> </div>
Total Cavalry of Line	10,462	7,690	75	19	94	193	735·0	8·98	18·45	
Rl. Artillery :										<div> <div>A { Woolwich 3 Chrstchrch 9</div> <div>B { Aldershot 9 Dorchester 3</div> <div>C { Woolwich 6 Canterbury 6</div> <div>D { Norwich 7½ Aldershot 4½</div> <div>E { Dorchester 5½ Aldershot 6½</div> <div>F & G Wlwich 8½</div> <div>H.. Birmng- ham } 10½</div> </div>
B Brigade R.H.A. }	1,152	1,280	9	3	12	74	1111·1	10·42	64·24	<div> <div>A { Aldershot 9 Woolwich 3</div> <div>B { Dublin 7 Curragh 5</div> <div>C { Curragh 7 Dublin 5</div> <div>D.. Exeter 12</div> <div>E { Sheffield 1 Coventry 11</div> <div>F.. Exeter 12</div> <div>G.. Woolwich 12</div> <div>H.. Dublin 12</div> </div>
C Brigade R.H.A. }	1,225	1,215	6	1	7	27	991·8	5·71	22·06	
Riding Estab- lishment	200	155	4	741·6	..	19·14	Woolwich 12

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died	Invalided.	
1st Brig. R.A.	1,257	1,604	11	1	12	59	1276.0	9.55	46.94	<div>Months.</div> <div> A { Sheerness 10½ Woolwich 1½ B & { Sheerness 1½ G { Shorncliffe 11½ C.. Woolwich 12 D { Woolwich 10½ Hilsea 1½ E.. Woolwich 12 F { Woolwich 11½ Sheerness 1½ H { Sheerness 4 Weedon 8 I { Portsmouth 10½ Woolwich 1½ K.. Weedon 12 A { Fermoy 7 Curragh 5 B { Dublin 9 Kilkenny 3 C { Curragh 7 Fermoy 5 D { Curragh 2 Athlone 10 E { Clonmel 4½ Curragh 7 Dublin ½ F.. Limerick 12 G { Kilkenny 4½ Clonmel 7½ H.. Ipswich 12 I.. Ballincollig 9 K { Woolwich 2 Bristol 8 Aldershot 1 No.1. Prtsmth 12 No.2 { Woolwich 2 Weymouth 10 No.3 { Woolwich 9 Prtsmth 3 Nos. { Prtsmth. 12 4 & 5 No.6. I. of Wght 12 No.7 { I. of Wght 9½ Prtsmth. 2½ A { Weedon 4 Nrthmptn. 8 B { Hilsea and Exeter 12 C { Shorncliffe 2½ Sheffield 9½ D { Woolwich 2½ Trowbridge 9½ E { Aldershot 2½ Newport & Brecon 9½ F { Shorncliffe 1½ Chichester 10½ G.. Hilsea 12 H.. Aldershot 12 I.. Sheffield 12 K.. Devonport 12 </div>

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
12th Brigade	930	810	2	1	3	15	871·0	3·22	16·13	Months. Nos. { Chl. Isla. 10 1,3,5 { Plymth. 2 Nos. { Portsmt. 9½ 2 & 4 { Plymth. 2½ Nos. { Portsmt. 3½ 6 & 7 { PmbkeDk 8½ A { Woolwich 1½ Aldershot 10½ B { Woolwich 2½ Aldershot 9½ C { Devonport 2½ Aldershot 9½ D { Leith Fort 2½ Newcastle 9½ E { Shobryns. 1½ Burnley 10½ F { Shobryns. 2½ Preston 11½ G { Woolwich 2½ Leith Fort 9½ H { Woolwich 2½ Aldershot 9½ I { Woolwich 7½ Newcastle 4½ K { Woolwich 8 Newcastle 3 No.1. { Dover 12 Dover 1½ No.2 { Eastbrne 5½ Newhvn. 4½ Shbryns. 1 No.3. { Dover 12 Nos. { Ireland 4 & 5 { & Dover 12 Nos. { Dover & 6 & 7 { Ireland 12 No.1. { Woolwich 9½ Guernsey 2½ Shbryns. 4½ No.2. { Woolwich 5 Jersey 2½ No.3. { Shbryns. 4½ Woolwh. 7½ Woolwh. 1½ No.4. { Gravesnd. 2 Dublin 8½ No.5. { Gravesnd. & Tilbury 12 No.6. { Woolwh. 4½ Shbryns. 7½ No.7. Woolwh 12
14th "	1,473	1,506	10	4	14	30	1022·4	9·50	20·37	
17th "	986	535	8	1	9	11	542·6	9·13	11·16	
21st "	984	1,009	7	..	7	28	1025·4	7·11	28·45	
Total Royal Artillery }	12,123	12,109	86	21	107	363	998·8	8·83	29·94	

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
Foot Guards:										Months.
Gren. Gds.,										
1st Bn. ..	880	499	2	4	6	16	567·0	6·81	18·18	{ London 5
										{ Windsor 6
										{ Aldershot 1
2nd Bn. ..	880	793	3	1	4	18	901·1	4·54	20·45	{ London 3
										{ Dublin 7½
3rd Bn. ..	877	657	7	2	9	16	749·1	10·26	18·24	{ Curragh 1½
										{ London 12
Coldm. Gds.,										
1st Bn. ..	894	466	4	1	5	25	521·2	5·59	27·96	{ Windsor 2
										{ London 10
2nd Bn. ..	910	592	5	1	6	28	650·5	6·59	30·77	{ London 7½
										{ Aldershot 1½
Scots F. Gds.,										{ Windsor 3
1st Bn. ..	897	600	7	3	10	10	668·9	11·15	11·15	{ Dublin 3
										{ London 9
2nd Bn. ..	884	536	8	4	12	23	606·3	13·57	26·02	{ London 11
										{ Aldershot 1
Total Foot Guards }	6,222	4,143	36	16	52	136	665·8	8·36	21·86	
1st Foot, }	669	515	9	1	10	19	769·8	14·95	28·40	Warley 12
1st Bn. }										
2nd Foot, }	782	667	4	2	6	14	852·9	7·67	17·90	Devonport 12
2nd Bn. }										
3rd Foot, }	780	523	3	..	3	14	670·5	3·85	17·95	{ Shorncliffe 9
2nd Bn. }										{ Dover 3
4th Foot, }	855	524	6	..	6	24	612·9	7·02	28·07	{ Aldershot 9
1st Bn. }										{ Portsdown 3
										{ Hill Fords 3
4th Foot, }	724	622	8	3	11	25	859·1	15·19	34·53	{ Chester, with det. at 5
2nd Bn. }										{ Liverpool & Weedon 7
										{ Aldershot 7
5th Foot, }	697	422	5	3	8	9	605·4	11·50	12·91	{ Glasgow & Ayr, with detach. at 5
2nd Bn. }										{ Paisley 7
										{ Dublin 7
6th Foot, }	651	360	1	3	4	9	523·0	6·14	18·82	{ Buttevant, with name- 12
2nd Bn. }										{ rous dets. 12
7th Foot, }	599	630	8	1	9	15	1051·7	15·02	25·04	Portsmouth 12
1st Bn. }										
7th Foot, }	819	582	4	2	6	21	710·6	7·33	25·58	{ Portland, with det. at 12
2nd Bn. }										{ Weymouth 12
8th Foot, }	688	494	4	3	7	16	718·0	10·17	23·25	Manchester 12
2nd Bn. }										
9th Foot, }	598	379	8	2	10	14	633·8	16·72	23·41	{ Dublin 9
1st Bn. }										{ Cork 3
9th Foot, }	896	770	4	3	7	27	859·4	7·81	30·13	{ Aldershot 9
2nd Bn. }										{ Shorncliffe 3
11th Foot, }	647	368	4	..	4	16	568·8	6·18	24·73	{ Dublin 7½
2nd Bn. }										{ Curragh 4½

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
12th Foot, 1st Bn. }	655	649	2	1	3	3	990·8	4·58	4·58	<div>Months.</div> <div> <div>Preston, with det. at Carlisle & I. of Man</div> <div>12</div> </div>
13th Foot, 2nd Bn. }	817	387	6	1	7	6	473·7	8·57	7·24	
14th Foot 2nd Bn. }	540	613	7	1	8	6	1135·1	14·81	11·11	<div> <div>Pembroke Dk. Kilkenny Sheffield Chester, with det. at Bradfd., Liverpool, & Weedon</div> <div>9 3 5 7</div> </div>
15th Foot, 1st Bn. }	677	497	1	..	1	12	734·1	1·43	17·72	<div> <div>Birr, with det. at Portumna Curragh</div> <div>7 5</div> </div>
15th Foot, 2nd Bn. }	800	694	5	2	7	9	867·5	8·75	11·25	<div> <div>Jersey, Guernsey, & Alderny. Aldershot</div> <div>6 6 6</div> </div>
16th Foot, 1st Bn. }	659	464	4	..	4	9	701·1	6·07	13·66	<div> <div>Newry, with det. at Dublin</div> <div>9 3</div> </div>
16th Foot 2nd Bn. }	810	980	4	..	4	13	1209·8	4·94	16·05	<div> <div>Canterbury, with det. Colchester</div> <div>5 7</div> </div>
17th Foot, 2nd Bn. }	739	611	5	1	6	10	826·8	8·12	13·53	<div> <div>Aldershot Curragh</div> <div>12 4</div> </div>
18th Foot, 1st Bn. }	846	557	6	1	7	15	658·4	8·27	17·73	<div> <div>Cork with det. Fermoy</div> <div>3 4</div> </div>
18th Foot, 2nd Bn. }	635	750	6	1	7	20	1181·1	11·02	31·50	<div> <div>Devonport</div> <div>12</div> </div>
20th Foot, 1st Bn. }	670	191	3	1	4	10	285·1	5·97	14·92	<div> <div>Cork with det. Curragh</div> <div>4 7</div> </div>
22nd Foot, 1st Bn. }	642	401	2	..	2	7	624·6	3·11	10·90	<div> <div>Kinsale, with detach.</div> <div>4 7</div> </div>
22nd Foot, 2nd Bn. }	848	632	7	..	7	13	745·3	8·25	15·33	<div> <div>Channel Isles</div> <div>7</div> </div>
23rd Foot 1st Bn. }	733	402	4	..	4	8	548·4	5·46	10·92	<div> <div>Aldershot</div> <div>12</div> </div>
23rd Foot 2nd Bn. }	910	671	5	2	7	17	737·4	7·69	18·68	<div> <div>Newport, Mon., with detach. Pembroke Dk. Chatham (Detach. at I. of Grain 2). Woolwich (Wing at Windsor 1). Portsmouth Birr</div> <div>9 3 7 2 5 11</div> </div>
25th Foot 1st Bn. }	683	323	2	..	2	10	472·9	2·93	14·64	<div> <div>Colchester Aldershot</div> <div>5 7</div> </div>
27th Foot ..	902	786	10	1	11	23	871·4	12·19	31·94	<div> <div>Dublin Jersey</div> <div>5 6</div> </div>
30th „ ..	636	528	6	1	7	2	830·2	11·01	3·14	<div> <div>Aldershot Colchester</div> <div>8 3</div> </div>
33rd „ ..	710	709	8	2	10	20	998·6	14·08	28·17	

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
34th Foot ..	824	691	3	1	4	10	838·6	4·85	12·13	<div>Months.</div> <div>Shorncliffe 9</div> <div>Dublin 4</div> <div>Newry, with det. 2½</div>
35th „ ..	755	550	4	1	5	12	728·5	6·62	15·90	<div>Newcastle-on-Tyne, with det. at Bradford 7½</div> <div>Sheffield, with det. 4½</div>
40th „ ..	901	752	4	1	5	14	834·6	5·55	15·54	<div>Mullingar, with det. 1½</div> <div>Curragh 6½</div> <div>Dublin 4½</div>
42nd „ ..	664	386	2	2	4	13	581·3	6·02	19·58	<div>Aldershot 9</div> <div>Devonport 3</div>
43rd „ ..	867	727	7	..	7	7	838·5	8·07	8·07	<div>Fermoy, with det. 8</div> <div>Kinsale, with det. 4</div>
46th „ ..	749	507	7	1	8	24	676·9	10·60	32·04	<div>Winchester 8</div> <div>Aldershot 4</div>
47th „ ..	646	424	2	..	2	9	656·3	3·09	13·93	<div>Limerick, with det. 8½</div> <div>Fleetwood with det. at Carlisle 3½</div>
50th „ ..	662	377	3	2	5	18	569·5	7·55	27·19	<div>Bristol, Exeter, & Trowbidge 3½</div> <div>Aldershot 8½</div>
51st „ ..	821	517	5	..	5	9	629·7	6·09	10·96	<div>Waterfrd., with det. 4</div> <div>Curragh 8</div>
57th „ ..	845	661	4	3	7	7	782·2	8·28	8·28	<div>Devonprt., with det. 8½</div> <div>Limerick, with det. 3½</div>
60th Foot } 4th Bn. }	834	504	3	1	4	14	604·3	4·80	16·79	<div>Colchester 8</div> <div>Aldershot 1</div> <div>Winchester 3</div>
67th Foot ..	893	790	11	1	12	19	884·6	13·44	21·28	<div>Aldershot 1½</div> <div>Dover 7½</div> <div>Shorncliffe 3</div>
68th „ ..	942	520	5	..	5	9	552·0	5·31	9·55	<div>Templemore with detach. 9½</div> <div>Cork, with det. 2½</div>
77th „ ..	702	367	4	2	6	13	522·8	8·55	18·51	<div>Portsmouth 12</div>
80th „ ..	877	768	12	1	13	11	875·7	14·82	12·54	<div>Belfast, with det. 11½</div> <div>Dublin ½</div>
82nd „ ..	661	425	11	1	12	17	643·0	18·15	25·72	<div>Portsmouth 5½</div> <div>Aldershot 6½</div>
84th „ ..	654	270	5	1	6	4	412·8	9·17	6·10	<div>Fermoy, with det. 12</div>
88th „ ..	624	414	10	1	11	15	663·5	17·63	24·04	<div>Portsmouth 12</div>

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Regiments, &c.	Average Annual Strength.	Admitted into Hospital.	Died.			Invalided.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.	Total.		Admitted.	Died.	Invalided.	
										Months.
90th Foot ..	643	294	4	1	5	12	457·2	7·78	18·24	Edinbrgh., with det. } 5 Glasgow, with det. } 7
91st „ ..	652	315	1	..	1	7	483·1	1·53	10·74	Aldershot } 9 Ft. George, with det. } 3
93rd „ ..	650	538	2	1	3	2	827·7	4·61	3·08	Aberdeen } 5½ Edinbrgh., with det. } 6½
94th „ ..	661	619	3	1	4	9	936·4	6·05	13·61	Aldershot } 9 Newport, with det. } 3
95th „ ..	643	602	3	1	4	20	936·2	6·22	31·10	Portsmouth } 12 Dover } 2
97th „ ..	834	617	6	1	7	9	736·9	8·39	10·79	Mullingar, with det. } 10 Curragh } 4
98th „ ..	838	475	4	2	6	7	566·8	7·16	8·35	Athlone, with det. } 8 Isle of Wight } 5
99th „ ..	642	545	5	1	6	13	848·9	9·34	20·25	Aldershot } 7 Bury, with detach. } 5½
100th „ ..	671	408	2	1	3	5	608·0	4·47	7·45	Aldershot } 6½ Bury, with detach. } 3
101st „ ..	647	540	5	..	5	30	834·6	7·73	43·37	Dover } 7 Aldershot } 5
102nd „ ..	647	427	7	1	8	17	660·0	12·36	26·27	Woolwich } 7 Aldershot } 2
Rifle Brig., 1st Bn. }	824	483	5	1	6	20	586·2	7·28	24·27	Dover } 3 Dover } 9
Rifle Brig., 2nd Bn. }	923	420	5	..	5	6	455·0	5·42	6·50	Shorncliffe } 3 Shorncliffe } 7
Rifle Brig., 4th Bn. }	907	603	2	..	2	15	664·8	2·20	16·54	Chatham } 5
Total Infantry Regiments }	47,420	34,237	317	68	385	838	722·0	8·12	17·67	
Depôt Brig. Royal Art. 1st Division..	580	652	2	1	3	..	1124·1	5·17	..	Sheerness } 12
2nd „ ..	1,700	2,136	8	4	12	..	1256·4	7·06	..	Woolwich } 12
Total ..	2,280	2,788	10	5	15	67	1222·8	6·58	29·38	
Cav. Depôts	718	632	..	..	6	..	880·2	8·95	..	
Infantry „	6,713	4,887	..	..	62	..	720·5	9·24	..	
Total ..	7,431	5,469	..	..	68	283	736·0	9·15	38·08	

The Royal Horse Guards furnished the highest ratio of admissions and deaths in the Household Cavalry, and the 1st Life Guards of invaliding; the excess of admissions was chiefly in cases of syphilis and gonorrhoea. The lowest ratio occurred in the 2nd Life Guards, stationed during nine months of the year in London.

In the Cavalry of the Line the ratio of admissions was highest in the 2nd Dragoon Guards at Colchester and Aldershot, chiefly from bronchitis, ulcers, boils, and accidental injuries; of deaths, in the 13th Hussars at Edinburgh and Leeds, and of invaliding, in the 4th Dragoon Guards at Manchester. The 1st Dragoon Guards at Newbridge and Dublin had the lowest ratio of admissions and invaliding, and the 12th Lancers at Aldershot and Hounslow, of deaths.

The 1st Brigade Royal Artillery had the highest ratio of admissions, the 4th Brigade of deaths, and the B Brigade Royal Horse Artillery of invaliding. The 17th Brigade Royal Artillery had the lowest ratio of admissions and invaliding, and the 12th the lowest ratio of deaths.

In the Foot Guards the highest ratio of admissions occurred in the 2nd Battalion Grenadier Guards, the excess being due to the outbreak of impetigo already noticed. The deaths were highest in the 2nd Battalion Scots Fusilier Guards, and the invaliding in the 2nd Battalion Coldstream Guards. The lowest ratios of admissions, deaths, and invaliding occurred respectively in the 1st Battalion Coldstream, the 2nd Battalion Grenadier, and the 1st Battalion Scots Fusilier Guards.

Of Infantry Regiments the 2nd Battalion 16th, at Canterbury and Aldershot, had the highest ratio of admissions, the excess being chiefly in cases of febricula, bronchitis and tonsillitis, gonorrhoea, skin diseases, and accidental injuries; the 82nd Regiment, at Portsmouth and Aldershot, the highest ratio of deaths; and the 101st, at Aldershot and Bury, of invaliding. The 1st Battalion 20th, at Cork and the Curragh, furnished the lowest proportion of admissions, the 1st Battalion 16th, in the Channel Islands, of deaths, and the 93rd, at Aberdeen and Edinburgh, of invaliding.

RE-VACCINATION.—In consequence of the wide-spread prevalence of small-pox among the general population, a much larger proportion than usual of soldiers was re-vaccinated, the operation having been performed on any men in whom the marks had become indistinct, when a case of small-pox occurred in the corps, or the disease was very general at the station. The regulation respecting the re-vaccination of all recruits on joining the service continues in force.

The following Table, framed from Abstract No. 2 in the Appendix, shows the results as reported in the monthly vaccination returns :—

	Total number Vaccinated.	Results.	Ratio per 1,000.				
			In those who bore marks of previous Small-Pox.	In those who bore good marks of previous Vaccination.	In those who bore doubtful marks of previous Vaccination.	In those who bore no marks of previous Vaccination or Small-pox.	Total.
Soldiers, not Recruits	14,283	{ A perfect Vaccine Pustule	371·3	319·0	280·9	395·0	321·4
		{ A modified ditto	351·0	402·0	368·8	309·2	390·9
		{ A failure in	277·7	279·0	350·3	295·8	287·7
		Total.. .. .	1000·0	1000·0	1000·0	1000·0	1000·0
Recruits..	25,561	{ A perfect Vaccine Pustule	330·1	357·0	444·6	560·8	367·0
		{ A modified ditto	349·6	358·4	326·9	238·9	351·7
		{ A failure in	320·3	284·6	228·5	200·3	281·3
		Total.. .. .	1000·0	1000·0	1000·0	1000·0	1000·0

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The general results among the recruits correspond very closely with those of the preceding year. Among the soldiers, not recruits, there has been a slight decrease in the proportion furnishing a perfect vaccine pustule, and in the proportion of failure, with of course an increase in the ratio of modified pustules. The failures did not greatly differ in soldiers and recruits, but the latter had a considerably higher proportion of perfect and the soldiers of modified vaccine pustules.

The state of vaccination among the recruits found fit for service at the Head-Quarters of Recruiting Districts during the year, is shown in the following Table :—

Recruiting Districts.	Marks of Small-Pox.	Marks of Vaccination.	No satisfactory Marks.	Proportion in every 1,000 Primarily Inspected.		
				Marks of Small-Pox.	Marks of Vaccination.	No satisfactory Marks.
London	157	4,747	134	31·2	942·2	26·6
Portsmouth	11	190	5	75·3	890·4	34·3
Devonport	10	168	14	52·1	875·0	72·9
Bristol	18	405	23	40·4	908·1	51·5
Birmingham	40	476	56	69·9	832·2	97·9
Peterborough	1	29	24	18·5	537·1	444·4
Manchester	32	338	20	82·0	866·7	51·3
Liverpool	57	826	34	62·2	900·7	37·1
York	2	126	6	14·9	940·3	44·8
Edinburgh	22	364	19	55·1	912·3	32·6
Glasgow	52	439	66	93·4	788·1	118·5
Inverness	4	35	2	97·6	853·6	48·6
Dublin	20	629	10	30·4	954·4	15·2
Total {	England ..	328	7,245	41·6	918·4	40·0
	Scotland ..	78	838	78·3	840·5	81·2
	Ireland ..	20	629	30·3	954·5	15·2
Total ..	426	8,712	407	44·6	912·7	42·7

Compared with the preceding year there has been a decrease in all three Divisions of the United Kingdom in the proportion of men bearing marks of small-pox, and in Scotland and Ireland in the proportion having no satisfactory marks. In England the proportion having no marks has been one-third higher than in 1870, but has only amounted to half the proportion in Scotland. The numbers bearing no satisfactory marks in Ireland have only amounted to one and a half per cent.

SANITARY REPORT.

Aldershot.

Inspector-General Lawson reports as follows :—

There was great deficiency of water during the early months of the year, and the supply from Bourley was cut off from the permanent barracks and South Camp, as far as was possible ; in July, water was again laid on from Bourley, and ten days afterwards, rather a severe outbreak of enteric fever made its appearance in R and S Lines, South Camp. As soon as this attracted notice, the wells in these were closed, and though a few cases appeared, both there and in other places subsequently, its force was decidedly checked. There was reason to suppose that emanations from the surface water drains, into

which slops are frequently thrown (notwithstanding strict orders to the contrary), contributed in some measure to these cases. The drains were flushed with carbolic acid, and the necessity for stricter enforcement of orders represented to the military authorities.

Some additional quarters were built for married families during the year, with single rooms only between the front and back walls, and, in a number of the small old quarters, doors were opened between the front and back rooms, so as to afford two rooms for large families and to secure better ventilation in them.

Eastern District.

Deputy Inspector-General Heffernan's Report contains the following remarks:—

The Medical Officer in charge of the 7th Dragoon Guards at Norwich, objects to the cooking arrangements as not affording sufficient variety, urging that a Deane's cooking range is required; and that the drainage is defective, but that the Engineer Department is at work putting it in order. Also that the hospital is not sufficiently large. Great improvements have been made at Norwich during the year, but the unusually large number of men stationed there lately, has given rise to complaints. The hospital is too small for the number of sick that may be expected, if the same number of men be continued there.

The Medical Officer in charge of the 10th Hussars, notices the difficulty of keeping clean the ablution-rooms, urinals, and water-closets attached to the barrack-rooms of the block unconnected with stables. These were planned with great care, and expensively fitted up, but it has been found very difficult to keep them in order.

He also remarks on the impropriety of having the canteen open so much, and states that in his opinion there is too great a facility for, or indeed temptation to, intemperance among soldiers; not open and obvious, but insidious and habitual. I agree with him, and think it would be well if there were more restrictions put on consumption of beer and spirits.

Generally speaking there have been very few complaints from officers serving in the Division, upon sanitary subjects, this year. Much has been done lately to improve the soldiers' quarters and remedy the defects that had been complained of previously.

There are, however, still some that require to be remedied. 1st. The whole of the latrines in the camp at Colchester, with the exception of those in the hospital, require reconstruction. The dry-earth system could easily be introduced.

2nd. An isolated hut, for the treatment of contagious diseases in the camp, is very much required. The present infection ward is too close to the other hospital hut, and there is no possibility of isolating it. There is a very good position available at the eastern end of the hospital enclosure, where there is a vacant space of considerable size.

3rd. The latrines of the barracks at Norwich require complete reconstruction. At present they are upon the old cesspool plan, and of the very worst description.

4th. The same remark applies to the latrines at Ipswich Barracks.

Sanitary Improvements.—Colchester.—A commencement has been made of introducing the dry-earth system of conservancy in the hospital at the camp, one of the two latrines having been altered and the other commenced. A skittle alley has been erected in the cavalry barracks.

Norwich.—A complete reconstruction and enlargement of the barrack-rooms have been effected, which will much improve the ventilation, and add to the comfort and healthiness of the men.

Ipswich.—The same improvement has also been carried out here.

Warley.—The latrines have been reconstructed.

During the summer an unused swimming bath was cleaned out and supplied with water, affording means of bathing.

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The provisions of the Contagious Diseases Act have been in force during the year. There has been a remarkable immunity from venereal diseases, which is, in my opinion, entirely attributable to the beneficial effects of the Act.

In my opinion the gymnasium has been very useful, and no instances have come to my knowledge this year of injury to the men who exercised there.

South-Eastern District.

Deputy Inspector-General Gordon, C.B. reports :—

Dover.—During the year 1871 no sanitary defect of great importance was reported in any of the barracks in the South-Eastern District. The health of the troops was satisfactory.

Western Heights.—Several improvements were made in the barracks in 1871. Repairs were effected in the latrines, and the drainage connected with the guard-room at the foot of the shaft. The necessity of having a separate building as a hospital for cases of infectious diseases has been again pointed out ; and correspondence has taken place regarding defects of construction of latrines and pipes connected with barrack-rooms in the north casemates.

Shorncliffe Camp.—The necessity of having a porch to the infectious ward was pointed out by the senior Medical Officer.

Hospital Appropriation.—The arrangements in this respect were modified in consequence of its being determined that in future the sick of all the regiments stationed at Dover should be treated there. This change rendered it practicable to place particular portions of the hospital under the charge of individual surgeons, in so far as cleanliness and order are concerned. Considerable improvements were effected in the drainage of Shorncliffe Camp. The basement of some of the huts was examined, and it being found that dampness existed under the floors, the huts were raised a few inches further from the ground, and with evident advantage.

Chatham.

Surgeon-Major Scott, Rifle Brigade, reports :—

It does not appear that there has been any disease attributable to sanitary defects in the barracks. No serious sanitary requirements have been reported.

The Medical Officer in charge of the Royal Engineers attributes some of the disease and inefficiency in that corps to want of suitable clothing, and suggests the use of a warm loose flannel jacket.

The sanitary improvements effected in the course of the year are as follows :—

Casualty Hospital, Chatham.—4 rooms re-appropriated for 11 men each, at 670 cubic feet per man.

Brompton Barracks.—Ventilating louvred gratings to certain rooms of married soldiers' quarters.

Chatham Barracks.—Ablution rooms of some soldiers' houses improved.

Southern.

Inspector-General McIllree reports that several improvements of a sanitary nature were carried out during the year 1871.

The following are among the principal that have been already effected, or are being carried out :—

Portsmouth.—The old ramparts round the town of Portsea are being rapidly demolished, and the moats and ditches are being filled in. The mill-dam, the effluvia from which has long been complained of, is also in course of being filled up. The moats and ramparts round Portsmouth will be demolished as soon as the works at Portsea are completed.

Proposals are under consideration for the erection of new and commodious barracks on sites obtained by the removal of the fortifications; these will replace the old and condemned "Clarence" and "Colewort" barracks.

Female Hospital, Portsea.—The ground about this building has been laid out with shrubs and flowers, &c., and a portion of the land in the rear converted into a kitchen garden.

Fort Monckton.—New latrines for the men have been erected in place of the very objectionable old ones on the pit system.

Parkhurst.—New and improved cooking apparatus has been introduced into the barracks at Parkhurst. The water-tanks have been improved and protected from weather, &c.

Christchurch.—Ablution-room to hospital is about to be provided.

During the year the forts on Portsdown Hill have been completed and handed over for use of the troops. They are now occupied by 1st Battalion 4th Regiment.

The health of the troops in the Southern District has been good. A few cases of small-pox occurred during the latter part of the year.

Woolwich.

Surgeon-Major Fogo, Royal Artillery, reports:—

1. In the last year an addition has been made to the barrack accommodation of the garrison by the occupation of certain buildings which were erected a few years ago for a "clothing store," where a large staff of tailors and sempstresses were employed in making up what is now done in Pimlico. These disposable stores have been utilized by the Major-General Commanding, and are occupied by two batteries of Artillery. The accommodation thus afforded is admirable in the men's rooms, but there are defects in the out offices. The latrines and urinals are very good, but the ablution and bath arrangements, as also the kitchens and means of cooking, are not so good as in the permanent barracks. The Medical Officer has noticed this in his report, but the Royal Engineer Department has taken considerable pains to construct temporary offices for these purposes, and, as such, there is not much fault to be found with them. The health of the men is not on this account in any way injuriously affected.

2. The men's rooms in the front of the old Royal Artillery Barracks have been brought to notice by one Medical Officer. He considers each front and back room, now separated by a wall, would be materially improved by being thrown into one, iron pillars being used to support the upper rooms. This was done some years ago in one house as an experiment, and it is a great improvement, but it seems very doubtful whether the barracks are worth the outlay, or even whether they would withstand the alteration.

3. In the Army Service Corps Barracks the defect in the ablution and bath accommodation is being rectified.

4. In the Royal Engineer Barracks several married non-commissioned officers' quarters in the casemate storey, below the level of the surface of the ground, have been condemned by a board of officers as damp, dark, and ill-ventilated.

5. In the barracks occupied by the infantry regiment, formerly the Royal Marine Barracks, the barrack-rooms are excellent, but they do not possess what is a great comfort to soldiers—open fire-places. The Marines warmed all the barrack-rooms with hot air from a furnace in the basement, which seems to have been an extravagant plan. This winter, owing to instructions from the War Office, I am told the Control Department discontinued the issue of coals, and the rooms have not latterly been warmed; but it must be noticed there are, in the casemate storey, rooms used as kitchen and dining-rooms, where fires are supposed to be burning until the evening. The men do not frequent these rooms, except for their meals; they prefer to be in their cold sleeping-rooms, where they can close every crevice by which fresh air can enter. Owing to the representations that were made, the Quarter-

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master-General of the Army and Inspector-General of Fortifications recently visited these rooms. I would strongly recommend the erection of grates in the sleeping rooms, not only as a comfort for the men, but as a sanitary improvement to assist ventilation and to keep the air dry.

6. *The barrack formerly the Royal Marine Infirmary.*—The wards of this hospital make excellent barrack-rooms, but alterations and additions in the latrine and urinal accommodation are much required. These have, however, been proposed for insertion in the Budget Estimates for 1873-74.

Netley.

Inspector-General Beatson, C.B., in his Annual Sanitary Report of the Royal Victoria Hospital, Netley, for the year ending 31st December, 1871, makes the following remarks:—

The admissions into the Royal Victoria Hospital, Netley, during the year 1871 have amounted altogether to 2,747.

Invalids.—Of the invalids from India, 1,826 arrived by the overland route, and 161 by the Cape of Good Hope. The highest number in hospital on any one day during the year was 891 on the 16th February; the lowest number 37 on the 18th December; and on 90 days the numbers were over 500. The average daily number in hospital being 271·77.

Water Supply.—There has been no change in the sources or amount of the water supply, so that under this head I have nothing to add to the remarks in my report of 1870, either as regards the general or the lunatic hospitals, both of which need a more convenient and liberal supply of water than is available.

Swimming Bath.—The arrangements for filling this bath are much more satisfactory since the steam-engine was substituted for the windmill; but the mistake has been made (although the result which would follow was pointed out) of drawing the water to fill the bath from the neighbourhood of the main sewer, instead of from the vicinity of the pier. The effect is that the water in the bath is far from pure; in fact the sewage bubbles are not unfrequently visible, while the odour of the water in the bath is very impure.

Officers' Quarters.—I consider the requirement of a certain number of quarters of suitable size, and near the hospital, for married officers of senior rank, a very pressing one. The erection of a quarter for the Medical Officer in charge of the lunatic hospital has been sanctioned.

Warming the General and Lunatic Hospitals.—As regards the latter, I believe the necessary arrangements for heating the corridors and wards by means of hot water or steam pipes are under consideration at present, and similar provisions and arrangements should be applied to this hospital.

Extra Baths for Lunatic Hospital.—This subject has been recently submitted for the consideration and decision of the authorities. I may, however, mention, with reference to the requirement pointed out in the last paragraph of my report for last year, that the main pipes in this building have since been protected by felt, in order to guard against the pipes bursting when the frost sets in.

Western District.

Staff Surgeon-Major White, C.B., reports:—

With the exception of venereal affections, and a few cases of sickness caused either directly or indirectly by drink, there has been very little disease attributable to preventible causes. The principal requirements are married quarters at Forts Tregantle and Scraesdon; kitchen at Millbay Barracks, where the men have to cook in their rooms, a want of variety in the cooking being the result; cells at Raglan Barracks and Millbay not sufficiently ventilated. The drainage at the hospital, Tregantle, has been partially rectified. The want of a suitable infectious disease hospital at Devonport has often been alluded to. The married quarters at Raglan Barracks and the Citadel are insufficient for the requirements of the corps stationed there.

Newport.—The Latrines are of a very faulty construction. New ones, on modern principles, are urgently required. The drainage was also very bad, but has been partially rectified. The hospital bath-rooms at the same station are in an unfinished state. Married quarters are also very much wanted. The stables are badly drained and ventilated, and the rooms over them are also badly ventilated. The ablution and bath-room accommodation is old and bad. The cook-houses are too small, and there is no means of either baking or roasting. The latrines are bad, and too near the source of water supply. The married quarters are overcrowded; the canteen is too small for a battery and a regiment, and is defective in ventilation.

Herfield, Bristol.—The ventilation of the prisoners' rooms was very defective; this has been partially remedied. The hospital privies also require covers.

Pembroke Dock.—The surface drainage near the hospital and about the huts is defective. Ridge ventilation is required in the kitchens.

Flubberton and South Hook.—There is no bath accommodation and no means of recreation. The drainage is also very defective.

Brecon.—The ventilation of the guard-room is defective. The conservancy system is bad; but it is hoped that this will be speedily repaired, as it is included in estimates for 1872. The water supply is not satisfactory, and a supply from the water company is recommended. Prisoners' room is badly ventilated, and the cells also. The new hospital privies on an improved principle are required.

Trowbridge.—The roof of some of the buildings is not sufficient protection against cold and heat. The supply of water to ablution rooms is not sufficient. New latrines are required. The drinking water is brought in carts; it is not of good quality, and insufficient in quantity. There are no married quarters. The hospital and barrack accommodation are insufficient.

Exeter.—The drainage in the neighbourhood of the stables is very defective, and the rooms are badly lighted.

Northern District of England.

Deputy Inspector-General Fraser, C.B., reports:—

I may briefly state the results of my sanitary inspection of the hospitals and barracks in the command, and what appear to me to be the most important sanitary defects, the removal of which would conduce to the further improvement of the general health and physical comfort of the soldier.

At *Northampton* an attic, which is only fit for stores, is still used as a barrack-room, and if accommodation cannot be otherwise provided, the room should be ventilated through the ridge and lighted by skylights. Gas should also be introduced into all the barrack-rooms, guard-rooms, &c. The hospital is too small and is often overcrowded, having only authorized cubic space accommodation for six patients. It should be enlarged and provided with a lavatory and bath, a water-closet, a dead-house, and suitable pack and other storerooms. A separate ward for contagious diseases, especially small-pox, now epidemic in the neighbourhood, should also be erected.

At *Weedon* the barrack cesspit latrines should be reconstructed. The hospital beds should be reduced to about 22, and the regulated numbers painted on the doors. A separate ward for contagious diseases is desirable.

At *Coventry* some of the stables (3) only have been ventilated with shafts through the roof. The barrack-rooms are still without gas. The hospital is old and in some particulars requires repair; it is also very much in want of an ablution and bath-room, with cold and hot water laid on; a water-closet, and suitable packstores, hospital expense stores within the barrack enclosure, should also be provided.

At *Birmingham* the manure heaps and ash-pits beside the upper parade ground, should be filled up to the level of the ground, paved and drained. The hospital ward accommodation should be reduced to the regulated number of ten, and an additional ward secured, by transferring the stores from the ward in the upper floor to some detached barrack or control storage. There is no separate ward for contagious diseases.

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At *Sheffield* the manure and ash-pits in the arches, under the upper parade ground, should be removed, and iron carts for daily removal of refuse substituted. The latrines would be much improved by conversion into water latrines.

At *Leeds*, the regulated barrack construction admits of only 529 cubic feet per bed, and to afford the authorized 600 cubic feet per man, one bed should be removed from each room. The space between the boundary wall and barracks is too limited, and more ground is wanted. The hospital is a bad one and in a low damp situation; the ward accommodation is totally inadequate, and the sick have consequently to be treated in two barrack-rooms, and in summer a marquee has to be used. There is no separate ward for contagious diseases. At 1,200 cubic feet per bed, there is space for only 12 beds in the two wards, yet they are overcrowded with 18 beds and patients. A new hospital appears to me to be indispensable.

At *Burnley*, the cavalry barrack-rooms are still without the new ventilating grates, and are not lit with gas, though it is laid on to the exterior of the barrack. The imperfect latrines should be reconstructed. The infantry barracks are at present occupied by married soldiers, but otherwise there is no accommodation for married soldiers. The hospital is a small and badly-constructed building, and the wards should be provided with the new ventilating grates and lighted with gas.

At *Ashton*, all the large cesspit privies should, as soon as practicable, be converted into water latrines. The beds in the hospital wards should be reduced in number to afford the authorized cubic space accommodation.

At *Bury*, two only of the barrack-rooms have been provided with the new grates, and gas has not been introduced either into the barrack-rooms or hospital wards. The privies demand the same change as at Ashton.

At *Preston*, the cesspit privies require conversion into water latrines; and the number of hospital beds should be reduced to afford the prescribed hospital cubic-space accommodation.

At *Fleetwood Hut Barracks*, the water supplying the ablution-rooms has been contaminated with sewage, and has been consequently disused; the town water supply should be laid on for all purposes. Gas is very much wanted in the new hospital and brick barrack huts.

At *Liverpool*, the Rupert House Barracks (a hired building) is in my opinion, unfit for permanent occupation.

At *Chester*, the hospital is too small, and its enlargement, with the addition of various conveniences, appears to me to be very necessary.

At *Carlisle* the hospital is too small and defective in accommodation; it should be extended or rebuilt.

At *Newcastle-on-Tyne* the stables are without ventilating shafts through the roofs of barrack-rooms above them; the latrines are not efficient, and require to be reconstructed. Married quarters are also very much wanted. The artillery (cavalry) hospital is too small and without a separate ward for contagious diseases.

At *Tynemouth* married quarters are much wanted. The guard-room should be provided with a new ventilating grate as in barrack, and the hospital latrine should be converted into a water one.

At *Sunderland* the barracks should be provided with gas, and the imperfect latrines converted into water ones. Iron carts should be substituted for ashpits. The hospital is a bad one, with its floor resting on the ground; the wards should be lit with gas; an ablution and bath-room, suitable store-room, and a good water latrine should be constructed.

At *Scarborough Castle* the new-pattern grates should be introduced into the rooms; the cook-house should be provided with an oven; the cesspit privy converted into a water latrine; and a bath, with water laid on to it, and ablution room should also be added. There is no hospital, one of the barrack-rooms being set apart for the treatment of sick. A separate small brick hospital should be erected, with the usual conveniences.

As regards the great prevalence of venereal disease in the district, more especially in the manufacturing towns, there is no Parliamentary or local ordinance in force for the prevention of the disease, and considerable opposition has been manifested against the extension of the Contagious Diseases Act into

Manchester. There are no special arrangements for nightly ablution. Venereal diseases have increased during the year.

United Kingdom.

North Britain.

The Principal Medical Officer, North Britain, writes that, except for occasional mention of temporary defects or insanitary conditions of either barracks or hospitals, the reports of the various Medical Officers in charge of regiments or detachments in the Command were satisfactory during the year.

Diseases of the respiratory system, due to the damp and changeable climate of Scotland, were prevalent in all the stations.

Small-pox, scarlet and enteric fevers were more or less epidemic amongst the civil population at most of the military stations; but the troops enjoyed a comparative immunity from those diseases.

Several sanitary improvements have been effected during the year in the barracks and hospitals in North Britain.

IRELAND.

Inspector-General Dane remarks that considering the great prevalence of zymotic disease among the civil population at many of the stations occupied by the troops, the comparative immunity of the latter is worthy of observation.

Dr. Dane does not concur with the view of the Principal Medical Officer at the Curragh Camp, as to the injurious influence of the climate on the invalid soldier from the tropics:—"No doubt the old huts with crevices in every direction are not suitable abodes in winter and spring for such men, but considering the nature of the soil and the dryness of the atmosphere in Camp (as contrasted with many other localities), I believe, if comfortable well-built huts were erected, the station would be most suitable for the class above referred to, and a personal experience in the years 1858 and 1859, confirmed in my mind the beneficial influence on invalids from India, at any rate."

Dr. Dane supports the views of the Medical Officers generally as to the bad state of the latrines at several stations in the Command, obviously arising from their defective construction. At Mullingar the effluvia from a large open cesspool gave rise, it was thought, to an outbreak of enteric fever. Immediate removal of the residents from that wing of the barracks arrested the progress of the disease.

Northern District, Ireland.

Surgeon-Major Gilborne, 6th Dragoon Guards, reports:—

The prevalence of fevers has much increased during the period under review when compared with former years. Twelve cases of enteric fever occurred, and the disease was almost exclusively confined to one corps, viz., the 97th Regiment stationed at Mullingar, and the whole of the cases occurred during the month of December; the cause of this outbreak is supposed to have been the insanitary condition of the latrines, which are mere open cess-pits. It has been decided to reconstruct these latrines, the dry earth system being proposed as a substitute; but they still remain in the same objectionable condition. As this service is included in the Barrack Annual Estimates for the current year, and is of an urgent character, it will doubtless be proceeded with at once.

With the exception of enteric fever no diseases were directly attributed to any insanitary condition of the barracks: and were it not for the unusual prevalence of venereal affections in Dublin and other stations, the health of the troops in the district would be considered very good.

*United
Kingdom.*

The Curragh.

Deputy Inspector-General McKinnon reports that no special causes have injuriously affected the general health, and that there has been a considerable improvement in the health of the Curragh command.

The new main or junction drain for conveying the sewage of the camp to the portion of the Curragh laid out for irrigation was completed on the 21st November, and the sewage turned on to the land. About one-third of the ground has been laid out for irrigation, and as yet the sewage has been only over two-thirds of the portion so laid out.

Within the inclosure an offensive smell is perceptible on a warm day, but in cold or windy weather it is not observed. The land inclosed is 26 acres, and is surrounded by a wire fence. The system of irrigation is as follows: A shallow trench (6 by 3 inches), termed the main channel, starts from the mouth of the pipe and runs along the highest ground; this is used solely for the supply of a series of secondary channels, feeders; these have the same slope as the ground and are placed at intervals of 30 yards; they supply a third set of channels called distributors, from which the irrigation of the ground is carried out. The distributors leave the feeders at intervals of 15 yards, and run very nearly horizontally. The ground between the distributors is called lands, and the irrigation of the lands is carried out by labourers, each land being under the sewage for 24 or 48 hours, according to circumstances. The duty of the labourer is to direct the sewage on to these different lands, and, in case of any solid accumulation after rain, he spreads it over the land. The sewage is simply diverted into the different channels by means of turf sods.

At present the system works well; but the grass, under the fertilizing influence of the sewage, is getting very strong in the roots, and will probably in time prevent the soil from thoroughly deodorizing and absorbing the liquid manure. It is therefore necessary that the land should be ploughed up, and, from its increased fertility, root crops would help the deodorization and prove a source of profit to the cultivator.

The necessity for ploughing the land is shown as follows:—1st. The effect of the foul water on the channels in which it runs is to make the bottoms impervious from slime, and in time the whole surface overflowed by the sewage will become similarly encrusted. 2nd. The rapid growth of vegetation tends to the same end, and prevents the percolation of fluids into the soil. 3rd. Following heavy rain the sewage is not so quickly absorbed as on other occasions, for pools of water collect and remain on the surface for considerable periods. 4th. The crust of the land being irregular, some portions are more elevated than others, and the consequence is an unequal distribution of the sewage, the higher parts of the ground remaining uncovered, while the lower parts receive more than their share—hence the necessity for the superintendence of a labourer to prevent the undue accumulation of sewage in any one spot, which in process of time would no doubt give rise to a nuisance injurious to the health of the people living in its vicinity. The sewage land, therefore, requires to be levelled in order that its whole extent may be called into use and then to be ploughed in order to facilitate the rapid absorption of fluids.

Young lads, out all day in the open air and undergoing vigorous exercise at drill, would improve more under a more liberal diet than that afforded by the present ration.

South-Western District of Ireland.

The Principal Medical Officer, South-Western District of Ireland, reports:—

The health of the troops during the year has been satisfactory. The latrines are on the old system at Kinsale, Fermoy, Kilkenny, Waterford, Ballincollig, and several of the small stations in the district, and their reconstruction on the "dry earth" or other improved system is very much desired. Those at Cork, Buttevant, and Youghal appear to be working satisfactorily.

Water Supply.—One of the wells at Kinsale has been closed, the water

being unfit for use. No steps have been taken to supply the troops at Templemore with water of a better quality. Good water can be introduced into the barracks by going to some expense. The present supply is obtained from an artesian well at that station. Owing to the amount of rainfall during the year the water supply has not failed at any of the stations in the district.

Gymnasium.—There is a gymnasium, with staff and appliances, at Fermoy ; where all the recruits on joining the garrison go through a course of instruction, with manifest advantage. The prisoners' room at Limerick requires a boarded floor instead of flags, which are too low and damp.

Married Quarters.—Married Quarters are being erected at Cork and Ballincollig. The hospital at Waterford is small for the requirements of the station, and a contagious disease ward is needed there, as well as at Cork, Carrick-on-Suir, &c. The ventilation in some of the wards and day-room of the Queenstown General Hospital requires improvement. The hospital itself should be reconstructed.

Section II.

On the Extent of Invaliding.

The extent of invaliding during the year 1871 among the troops at home, and in each arm separately, is shown in the following Table :—

	Troops generally.	Household Cavalry.	Cavalry of the Line.	Royal Artillery (including the Depot Brigade).	Foot Guards.	Infantry Regiments.	Depôts.	Royal Engineers and Departmental Corps.
Strength	99,331	1,204	10,462	14,403	6,222	47,420	7,431	6,629
1871.. { Number discharged as Invalids ..	1,881	12	193	430	136	838	283	78
Ratio per 1,000 ..	18·94	9·97	18·45	29·85	21·86	17·67	38·08	11·78
1861-70, Ratio per 1,000	33·76	16·28	30·74	28·41	27·45	20·85	43·14	13·25

The discharges by invaliding in 1871 were much below the proportion in the preceding year in all the arms except the Foot Guards, in which the reduction amounted only to 1·22 per 1,000. The ratio was much below the average of the last ten years, except in the Royal Artillery, and it was considerably higher in it than in the other arms, except the Depôts.

Section III.

On the Number constantly Sick in Hospital of the Troops serving in the United Kingdom.

The proportion per 1,000 of mean strength constantly non-effective from sickness during the year, and the average duration of the cases in hospital, are shown in the following Table for the troops generally and for each arm of the service :—

United Kingdom.

		Troops generally.	Household Cavalry.	Cavalry of the Line.	Royal Artillery.	Foot Guards.	Infantry Regiments.	Depôt Brigade Royal Artillery.	Depôts.
Mean daily sick per 1,000 of strength ..	1871 ..	38·78	31·89	37·75	47·88	41·21	32·29	50·22	40·67
	1861-70	46·01	30·88	40·87	46·22	48·84	40·52	53·85	45·27
Average sick time to each Man in the course of the Year ..	1871 ..	Days. 14·16	Days. 11·64	Days. 13·78	Days. 17·47	Days. 15·04	Days. 11·79	Days. 18·33	Days. 14·84
	1861-70	16·79	11·27	14·92	16·87	17·83	14·79	19·65	16·52
Average duration of the Cases	1871 ..	17·35	17·48	18·74	17·54	22·59	16·32	14·99	20·17
	1861-70	18·39	18·25	17·71	18·74	22·65	18·87	18·35	17·62

The proportion constantly sick has been slightly above the average in the Household Cavalry and Royal Artillery, and under it in all the other arms. The reduction has been most marked in the Infantry and Foot Guards. The latter still continue to have the longest average duration of cases in hospital.

Section IV.

On the Influence of Age on the Mortality of Troops serving in the United Kingdom.

The mortality at different ages, arranged in quinquennial periods of life, in the various arms of the Service, is shown in the following Table, compiled from Abstract No. 3 in the Appendix :—

Corps.	Annual Ratio of Deaths per 1,000 Living, at the following Ages :—					
	Under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and upwards.
Household Cavalry .. .. .	..	6·25	..	16·38	22·38	10·00
Cavalry of the Line	·47	7·11	2·88	14·49	30·65	44·05
Royal Artillery	3·58	3·70	6·58	14·33	27·23	43·90
Foot Guards	3·13	8·95	7·78	13·33	11·01	42·85
Infantry Regiments	4·10	6·46	6·95	12·29	16·33	27·73
Depôt and Coast Brigades Royal Artillery, and Depôt Battalions. . .	4·04	3·43	8·32	16·31	22·84	18·78
Ditto, ditto, 1861-70	4·64	8·17	11·26	17·49	22·12	25·56
Average of preceding, exclusive of all Depôts.	3·53	6·23	6·11	12·92	19·70	32·10
Ditto, ditto, 1861-70	2·64	5·40	7·46	12·38	16·23	18·73
Civil Male Population { England and Wales ..	7·41	8·42	9·21	10·23	11·63	13·55
{ Healthy Districts. ..	5·83	7·30	7·93	8·36	9·00	9·86

The mortality among the troops, exclusive of the Depôts, shows an excess above the average of the preceding 10 years at all the ages above 30, and also at the age 20-25. In the Depôts the mortality has been lower than the average at all the periods of life, except between 35 and 40.

Section V.

On the Recruiting of the Army.

During the year 1871 there were 14,365 recruits examined at the Head-*United* Quarters of the Districts, 13,330 at the regiments and depôts, and 8,517 by *Kingdom.* civilian medical practitioners, making a total of 36,212. The rejections on primary inspection amounted to 10,836, and on secondary inspection to 1,178, together 12,014, being in the ratio of 331·8 per 1,000 inspected, and about 5 per 1,000 under the proportion in the preceding year.

The following Table shows the proportion rejected in each of these three groups :—

	Number of Recruits Primarily Inspected.	Number Rejected.			Ratio of Rejections per 1,000 Examined.	
		Primary Inspections.	Secondary Inspections.	Total.	Primary Inspections.	Primary and Secondary Inspections.
At Head-Quarters of Recruiting Districts	14,365	4,820	} 408	9,446	{ 335·5	} 341·1
At Regiments and Depôts	13,330	4,218			{ 316·4	
By Civil Medical Practitioners	8,517	1,798	770	2,568	211·1	301·5
Total	36,212	10,836	1,178	12,014	299·2	331·8

There has been an increase in the proportion rejected on primary inspection at the Head-Quarters of Districts, a marked decrease at Regiments and Depôts, and an increase among those examined by Civilian Medical Practitioners. The general result of primary and secondary inspections combined, shows a decrease in the rejections of recruits inspected by Army Medical Officers to the extent of about 7 per 1,000, and an increase of 3·3 in those inspected by civilians.

Deducting from the total inspected the numbers rejected on primary inspection, and calculating upon the remainder the number rejected at secondary inspection, it appears that the ratio per 1,000 was 21·9 in the case of recruits primarily inspected by Army Medical Officers, and 114·6 of those by civilian practitioners. This is a slightly greater proportion in the former, and smaller in the latter, than in 1870, when the ratios were 16 and 116 per 1,000 respectively.

The following Table, framed from Abstract No. 4 in the Appendix, shows the number of recruits inspected and the proportion rejected on primary and secondary inspection, at the Head-Quarters of each of the Recruiting Districts :—

Districts.	Total Number Inspected.		Ratio found Unfit per 1,000 Inspected.	
	Primary Inspections.	Secondary Inspections.	Primary Inspections.	Secondary Inspections.
London	7,436	2,030	322	72
Portsmouth	251	399	418	125
Devonport	268	437	284	69
Bristol	647	740	311	132
Birmingham	853	564	329	188
Peterborough	71	462	239	67
Manchester	688	85	433	212
Liverpool.. ..	1,384	442	337	152
York	179	660	251	121
Glasgow	969	103	425	126
Edinburgh	561	92	289	43
Inverness.. ..	51	42	196	71
Dublin	1,007	671	346	109
Total	14,365	6,727	335	107
Ratio in 1870 .. ..	..	..	325	108

There has been an increase of ten per 1,000 in the proportion rejected of those primarily inspected, and a decrease of one in those sent in from the out-stations of the districts for secondary inspection. The Head-Quarters at which the increased primary rejections occurred were London, Birmingham and Inverness. The highest proportion of primary rejections took place, as in the preceding year, at Manchester, Portsmouth and Glasgow, and of secondary at Manchester, Birmingham and Liverpool. At London, where the numbers primarily inspected exceeded the total of all the other Head-Quarters, the ratio was under the average, although higher than in 1870, and the ratio of secondary rejections was also very low.

The native countries of the recruits, and the proportion from each country rejected as unfit, were as follows :—

Native Countries of Recruits.	Head-Quarters of Recruiting Districts.		Head-Quarters of Regiments and Depôts.		By Civil Medical Practitioners.		Subsequently Rejected on Secondary Inspection.		Total.		Proportion Rejected per 1,000 Inspected.
	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Of those who had been found fit by Army Surgeons.	Of those who had been found fit by Civilians.	Primarily Inspected.	Rejected at Primary and Secondary Inspections.	
England	10,678	3,578	10,100	3,139	7,267	1,580	311	622	23,045	9,230	399.1
Wales	186	43	117	52	294	52	5	39	597	191	319.9
Scotland	1,551	512	1,117	374	315	44	26	35	2,983	891	332.2
Ireland	1,822	648	1,887	631	624	121	64	73	4,333	1,537	354.7
British Colonies and Foreign Countries ...	128	39	109	22	17	1	2	1	254	65	255.9
Total	14,365	4,820	13,330	4,218	8,517	1,798	408	770	36,212	12,014	331.8

There has been a slight increase in the ratio of rejections of English recruits, and a decrease in all the others.

The proportion of recruits furnished by each of the countries in every 1,000 inspected was as follows:—

Of England and Wales	....	....	....	790.9
Scotland	....	....	....	82.4
Ireland	....	....	....	119.7
Colonies and Foreign Countries	....	....	....	7.0

There has been a decrease in the proportion of recruits furnished by England and Wales, compared with 1870, to the extent of 29 per 1,000, while there has been an increase of 16 per 1,000 from Scotland and 11 per 1,000 from Ireland; there has been a slight increase also in the natives of British Colonies and Foreign Countries.

The following Table shows the number of recruits inspected for each arm of the service, and the number rejected as unfit,

	Head-Quarters of Recruiting Districts.		Regiments and Depôts.		Inspected by Civil Medical Practitioners.		Total Primary Inspections.		Rejected on Secondary Inspection.	Total.		Ratio of Rejections per 1,000 Recruits Inspected.
	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.		Inspected.	Rejected.	
Enlisted for—												
Household Cavalry ...	...	...	165	86	...	...	165	86	5	165	91	551.6
Cavalry of the Line ...	1,765	500	1,050	300	336	44	3,151	844	62	3,151	906	287.2
Royal Artillery and Engineers ...	2,077	672	4,188	1,049	1,133	176	7,398	1,899	147	7,398	2,046	276.6
Foot Guards ...	144	49	274	69	867	213	1,285	331	220	1,285	551	428.8
Infantry Regiments and Depôts ...	2,798	918	6,776	2,418	4,279	708	13,853	4,044	360	13,853	4,404	317.9
General Service ...	7,581	2,681	877	296	1,902	655	10,360	3,632	384	10,360	4,016	387.6
Total ...	14,365	4,820	13,330	4,218	8,517	1,798	36,212	10,836	1,178	36,212	12,014	331.8

There has been an increase compared with the results for 1870 in the proportion of rejections for the Household Cavalry; the proportion has been the same in the two years for the Ordnance; and there has been a decrease for the other arms, most marked in the Infantry Regiments and Depôts, but this is probably the result of stating separately the numbers enlisted for General Service, of which the proportion rejected has considerably exceeded that of the Infantry, though still much under the Household Troops.

The numbers rejected on account of the different classes of disabilities at primary and secondary inspection, are shown in the following Table:—

RETURN showing the Number of Recruits Rejected during the Year 1871, with the Causes arranged in Classes, and the Ratio per 1,000 in each Class.

Class.	Causes of Rejection, in Classes.	Primary Inspections.										Rejected on Secondary Inspection.		Total Rejected on both Primary and Secondary Inspection.					
		At Head-Quarters of Recruiting Districts.		At Head-Quarters of Regiments & Depôts.		By Civil Medical Practitioners.		Total.		Of Recruits examined by Army Medical Officers.	Of Recruits examined by Civil Medical Practitioners.	Of Recruits previously examined by Army Medical Officers.	Of Recruits previously examined by Civilians.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Total Number Rejected.	Total Ratio per 1,000.
		Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.										
1	Syphilis	207	14.40	253	18.98	83	9.74	543	14.99	13	37	473	17.08	120	14.09	593	16.88		
2	Scrofula	99	6.89	86	6.45	34	3.99	219	6.05	18	10	203	7.83	44	5.17	247	6.83		
3	Phthisis	49	3.41	77	5.78	42	4.93	168	4.61	15	10	141	5.09	52	6.11	193	5.33		
4	Impaired Constitution ..	148	10.30	79	5.93	34	3.99	261	7.20	14	19	241	8.70	53	6.22	294	8.12		
5	Muscular Tenuity and Debility ..	750	52.21	668	50.11	76	8.92	1,494	41.26	67	76	1,485	53.62	152	17.85	1,637	45.21		
6	Other General Diseases ..	149	10.37	47	3.53	6	.70	202	5.58	6	7	202	7.29	13	1.53	215	5.94		
7	Diseases of Nervous System ..	22	1.53	11	.82	2	.24	35	.97	6	10	39	1.41	12	1.41	51	1.41		
8	Weakness of Intellect ..	15	1.04	31	2.33	2	.24	48	1.33	5	6	51	1.84	8	.94	59	1.63		
9	Diseases of Eyes and Eyelids ..	727	50.61	543	40.73	222	26.07	1,492	41.20	50	92	1,320	47.66	314	36.87	1,634	45.12		
10	Diseases of Nose and Mouth ..	41	2.85	8	.60	17	1.99	66	1.82	1	6	50	1.81	23	2.70	73	2.02		
11	Diseases of Ears	24	1.67	10	.75	2	.24	36	.94	2	8	36	1.30	10	1.17	46	1.27		
12	Deafness	41	2.85	13	.97	3	.35	57	1.57	4	8	63	2.09	11	1.29	69	1.90		
13	Impediments of Speech ..	28	1.95	11	.83	2	.24	41	1.13	1	1	40	1.45	3	.36	43	1.19		
14	Disease of Heart	301	20.95	411	30.83	143	16.79	855	23.61	43	54	755	27.26	197	23.18	952	26.29		
15	Disease of Arteries (Aneurism) ..	2	.14	2	.15	1	.12	5	.14	..	1	4	.15	2	.23	6	.16		
16	Disease of Veins (Varix) ..	197	13.71	256	19.20	164	19.26	617	17.04	13	35	466	16.83	199	23.36	665	18.36		

United
Kingdom.

RETURN—continued.

Class.	Primary Inspections.										Rejected on Secondary Inspection.		Total Rejected on both Primary and Secondary Inspection.					
	At Head-Quarters of Recruiting Districts.		At Head-Quarters of Regiments & Depôts.		By Civil Medical Practitioners.		Total.		Of Recruits previously examined by Army Medical Officers.		Of Recruits previously examined by Civilian.	Medical Officers.	Of Recruits examined by Army Medical Officers.		Of Recruits examined by Civil Medical Practitioners.		Total.	
	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.			Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.
	14,366	13,330	8,517	36,212									27,698	8,517	36,212			
17	76	5.29	41	3.06	54	6.34	171	4.72	6	4.44	12		123	4.44	66	7.75	189	5.22
18	213	14.83	141	10.58	46	5.40	400	11.05	10	13.14	44		364	13.14	90	10.57	454	12.54
19	166	11.55	185	13.88	145	17.02	496	13.70	27	13.65	27		378	13.65	172	20.19	550	15.19
20	96	6.68	77	5.78	18	2.11	191	5.27	3	6.36	14		176	6.36	32	3.76	208	6.74
21	67	4.65	20	1.50	16	1.88	103	2.84	5	3.32	7		92	3.32	23	2.70	115	3.18
22	16	1.11	14	1.05	3	.35	33	.91	..	1.08	..		30	1.08	3	.35	33	.91
23	205	14.27	194	14.55	213	25.01	612	16.90	18	15.06	40		417	15.06	253	29.70	670	18.50
24																		
25	51	3.55	18	1.35	37	4.34	106	2.93	..	2.49	6		69	2.49	43	5.05	112	3.09
26	121	8.42	95	7.13	39	4.59	255	7.04	18	8.45	32		234	8.45	71	8.34	305	8.42
27	187	13.02	200	15.00	118	13.86	505	13.95	16	14.55	76		403	14.55	194	22.78	597	16.49
28	77	5.36	124	9.30	30	3.52	231	6.38	9	7.58	19		210	7.58	49	5.75	259	7.15
29	57	3.96	51	3.83	2	.24	110	3.04	5	4.08	7		113	4.08	9	1.06	122	3.37
30	92	6.48	43	3.23	4	.47	139	3.84	4	6.02	6		189	6.02	10	1.17	149	4.11
	67	4.66	54	4.05	65	7.63	186	5.14	2	4.44	19		128	4.44	84	9.86	207	5.72

ARMY MEDICAL DEPARTMENT

RETURNS—continued.

Class.	Primary Inspections.										Rejected on Secondary Inspection.		Total Rejected on both Primary and Secondary Inspection.				
	At Head-Quarters of Recruiting Districts.		At Head-Quarters of Regiments & Depôts.		By Civil Medical Practitioners.		Total.		Of Recruits previously examined by Army Medical Officers.	Of Recruits previously examined by Civililians.	Of Recruits examined by Army Medical Officers.		Of Recruits examined by Civil Medical Practitioners.		Total.		
	Number	Ratio per 1,000.	Number	Ratio per 1,000.	Number	Ratio per 1,000.	Number	Ratio per 1,000.			Number	Ratio per 1,000.	Number	Ratio per 1,000.			
									14,365	13,330					8,517	36,213	
31	109	7.59	66	4.95	37	4.34	212	5.85	2	10	177	6.39	47	5.52	224	6.19	
32	4	.28	1	.07	..	..	5	.14	..	..	5	.18	..	..	5	.14
33	6	.42	2	.15	..	..	9	.25	..	..	9	.32	1	.12	10	.28
34	303	21.09	282	21.16	129	15.15	714	19.72	13	51	598	21.59	180	21.13	778	21.48	
35	20	1.39	2	.15	..	..	22	.61	1	1	23	.83	1	.12	24	.66
36	17	1.18	32	2.40	1	.12	50	1.38	6	4	55	1.99	5	.59	60	1.66	
37	70	4.87	70	5.25	7	.82	147	4.06	4	15	144	5.20	22	2.58	166	4.58	
	4820	335.53	4218	316.43	1798	211.11	10,836	299.24	408	770	9,446	341.07	2568	801.51	12,014	331.77	
	Total Rejected ..																

Causes of Rejection, in Classes.

Other Affections of the Cutaneous System.
Malformation of Ears ..
" Nose and Mouth ..
" Chest and Spine ..
" Urinary or Genital Organs ..
Marks of Punishment, or of letter D or B C ..
Marks of treatment, Blistering, &c. ..

Total Rejected ..

Compared with the results for 1870, there has been a considerable increase in the proportion rejected at the Head-Quarters of Recruiting Districts for muscular tenuity and debility, and there has also been an increase for impaired constitution, other general diseases, diseases of the eyes and eyelids, of the bones and muscles, and of the heart. This has been, to some extent counter-balanced by a decrease in the rejections for defects of the lower extremities, varicose veins, varicocele, ulcers, wounds and cicatrices, malformation of chest and spine, and for marks of treatment, blistering, &c. In the primary inspection at Regiments and Depôts, there was a decrease in cases of varicose veins and varicocele, flat-feet, ulcers, wounds and cicatrices, and malformation of chest and spine, while the principal increase was in muscular tenuity and debility. The principal difference in the results of the examination by civil medical practitioners was an increase in the proportion rejected for muscular tenuity and debility, varicocele, and for defects of lower extremities, and a decrease in that for malformation of chest and spine, and for marks of treatment, blistering, &c.

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Taking the results of all the examinations, there has been a marked increase in the rejections for muscular tenuity and debility, and a trifling increase in several of the other classes, and there has been a notable decrease in varicose veins, defects of lower extremities, and malformation of the chest and spine.

The most marked difference in the results of the inspections by Army Medical Officers and civil practitioners is to be found in the proportion rejected for muscular tenuity and debility, which is nearly thrice greater by the military than by the civilian examiners. There is also an excess in other general diseases, and in diseases of the eyes and eyelids. On the other hand, the proportion rejected by the civil medical practitioners has been higher in varicocele, varicose veins, hernia, and defective condition of the lower extremities.

The following Table, framed from Abstract No. 6 in the Appendix, shows the proportion of recruits at each age in every 10,000 examined.

Proportion in 10,000 Examined.	Boys under 17.	17 to 18.	18 to 19.	19 to 20.	20 to 21.	21 to 22.	22 to 23.	23 to 24.	24 to 25.	25 and upwards.
At Head-Quarters of Recruiting Districts ..	94	597	2,458	2,526	1,544	946	690	525	529	91
At Regiments and Depôts ..	351	836	2,431	2,354	1,392	923	737	509	355	112
By Civil Medical Practitioners	63	337	2,296	2,874	1,571	949	750	544	553	63
Total ..	181	624	2,410	2,545	1,494	938	722	524	470	92

Compared with the preceding year there was a marked decrease in the proportion between the ages of 17 and 19, and a marked increase between 19 and 23. At the other ages the results of the two years did not vary materially except at 25 and upwards, when there was a considerable decrease. The differences above noted were probably the result of carrying out more rigidly the principle of not recruiting men under 20 for service in India unless under special circumstances.

The following Table, framed from Abstract No. 7 in the Appendix, shows the proportion of recruits at each height in every 10,000 examined.

*United
Kingdom.*

Proportion in 10,000.				Inspected at Head-Quarters of Recruiting Districts.	Inspected at Regiments and Depôts.	Inspected by Civil Medical Prac- titioners.	Total.
Ft.	In.	Ft.	In.				
	Under 5	3	..	86	312	35	157
5	3 to 5	4	..	13	180	5	73
5	4 „ 5	5	..	1,175	2,080	843	1,430
5	5 „ 5	6	..	3,255	2,298	2,912	2,822
5	6 „ 5	7	..	2,283	1,895	2,301	2,145
5	7 „ 5	8	..	1,592	1,458	1,676	1,562
5	8 „ 5	9	..	811	893	1,102	910
5	9 „ 5	10	..	481	457	687	520
5	10 „ 5	11	..	184	208	269	213
5	11 „ 6	0	..	84	138	107	109
6	0 and upwards			36	81	63	59
Total				10,000	10,000	10,000	10,000

Compared with results for 1870, there has been a decrease in the proportion of recruits from 5 feet 3 inches to 5 feet 4 inches, from 5 feet 5 inches to 5 feet 7 inches, and of 6 feet and upwards, and an increase at all the other heights, but most marked from 5 feet 4 inches to 5 feet 5 inches.

The weights of the recruits inspected at the head-quarters of the district^s are stated in Abstract No. 8 of the Appendix, from which the following results have been calculated :—

Proportion in 10,000 Examined.				Primary Inspections.	
				At Head- Quarters of Regiments and Depôts.	At Head- Quarters of Recruiting Districts.
lbs.	lbs.				
Under 100		..	..	227	102
From 100	to 110	..	..	53	357
„	110 to 120	..	..	423	2,024
„	120 to 130	..	..	1,735	3,176
„	130 to 140	..	..	3,886	2,487
„	140 to 150	..	..	2,532	1,251
„	150 to 160	..	..	1,009	434
„	160 to 170	..	..	477	130
„	170 and upwards	..	..	158	39
				10,000	10,000

A comparison of the results for the two classes of recruits would lead to the conclusion that a better class of recruits, as regards physical development, is obtained at the regiments and depôts than at the head-quarters of recruiting districts. Omitting those under 110 lbs. as including chiefly boys and specially-enlisted lads, the regiments show a much smaller proportion under 130 lbs. than the districts, and the excess at the regiments is maintained throughout the higher weights. Compared with the results of the preceding year for the district recruits there is but a slight variation at any of the weights, not greater than might be anticipated from the fluctuations arising from limited numbers.

The following Table shows the state of education among the recruits

primarily inspected at the head-quarters of districts and at regiments and depôts. There is no information available respecting those examined by civilian medical practitioners :—

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	Unable to Read or Write.	Able to Read only.	Able to Read and Write.	Not Re-ordered.
At Head-Quarters of Recruiting Districts	2,133	999	11,233	..
At Regiments and Depôts	1,829	1,630	9,286	585
Total	3,962	2,629	20,519	585
<i>Ratio per 1,000 examined.</i>				
At Head-Quarters of Recruiting Districts	148·5	69·5	782·0	..
At Regiments and Depôts	137·2	122·3	696·6	43·9
Total	143·1	94·9	740·9	21·1

A defect in the returns from Woolwich, which it has been found impossible to supply, unfortunately leaves the state of education of 585 of the men inspected there uncertain, and consequently vitiates to some extent the strict accuracy of the comparison between the two classes of recruits and with the results of previous periods. It may be stated generally, however, that there is an increase in the proportion able to read and write in both classes. The proportion totally uneducated was slightly greater in the recruiting districts, but the proportion able to read only was greatest in the recruits enlisted at regiments and depôts. The proportion of those able to read and write was, as in 1870, higher in the districts than at the regiments, but the difference between the two classes was less marked than in that year.

The occupation of the recruits previously to enlistment, and the proportion of rejections in each group are shown in the following Table :—

Occupations of Recruits.	Number Inspected.	Rejected on Primary Inspection.	Rejected on Secondary Inspection.	Total Rejected.	Ratio per 1,000 Rejected.
1. Labourers, Husbandmen, and Servants	23,092	6,937	768	7,705	333·7
2. Manufacturing Artisans (as Clothworkers, Weavers, Lace Makers, &c.)	2,900	998	119	1,117	385·1
3. Mechanics employed in Occupations favourable to physical development (as Carpenters, Smiths, Masons, &c.)	6,595	1,920	137	2,117	321·0
4. Shopmen and Clerks	2,811	862	74	936	333·0
5. Professional Occupations, Students, &c.	279	80	3	83	297·5
6. Boys	535	39	17	56	104·7
Total	36,212	10,836	1,178	12,014	331·8

Compared with the results for 1870, there was an increase in the rejections of boys, and a decrease in all the other groups, but most marked in the class

United Kingdom.

of manufacturing artizans, among whom, however, the ratio of rejections still continues to be the highest.

The proportion per 1,000 of recruits furnished by each group of occupations was as follows :—

1. Labourers, Husbandmen, and Servants	637·7
2. Manufacturing Artizans (as Clothworkers, Weavers, Lace-makers, &c.)	80·1
3. Mechanics employed in occupations favourable to physical development (as Carpenters, Smiths, Masons, &c.)	182·1
4. Shopmen and Clerks	77·6
5. Professional occupations, Students, &c.	7·7
6. Boys	14·8
Total	1,000

There has been a decrease, compared with the proportion in 1870, in the enlistment of labourers and of mechanics employed in favourable occupations, but not to such an extent as to counterbalance the large increase obtained from these two classes in that year.

In continuation of the enquiry commenced in last Report, as to the physical qualities of the recruits passed into the Service, the following Table has been prepared showing the numbers who joined the Service, as stated in the Commanding Officer's returns, and the numbers discharged as unfit before completing their first year of service. The Table also shows the average obtained by adding half the numbers who joined in 1870 to half the numbers in 1871, in accordance with the principles fully explained in last Report :—

	No. of Recruits who joined in 1871.	No. of Men Invalided in 1871 under 1 year's service.	Average of Recruits joined in 1870 and 1871.	No. of Men Invalided in 1871 under 1 year's service.	Ratio Invalided per 1,000 of average.
Household Cavalry ..	102	1	108	1	9·26
Cavalry of the Line ..	1,779	46	1,546	46	29·75
Royal Artillery ..	3,019	37	2,212	37	16·72
Foot Guards ..	757	21	810	21	28·39
Infantry Regiments ..	10,155	165	10,396	165	16·15
Depôts, Cavalry and Infantry ..	3,723	50	4,007	50	12·45
Depôt Brigade, R.A... ..	1,911	17	1,801	17	9·44

Compared with the results for 1870 there has been an increase in the ratio invalided from the Household Cavalry and Foot Guards, Cavalry of the Line, and Infantry Regiments, and a decrease in the Royal Artillery and the Depôts. The general result, however, has been an increase in the ratio invalided of 2·42 per 1,000. The increase has been most marked in the Cavalry of the Line, in which the proportion was nearly double that of the preceding year. The proportion thus invalided from the Foot Guards, though under that of the Cavalry, is still greatly in excess of all the other arms.

On incorporating the results of the depôts with those of their respective arms, the following general results are obtained :—

Household Cavalry	9·3	per 1,000 of strength
Cavalry of Line and Depôts	25·5	" "
Royal Artillery and Depôt	13·5	" "
Foot Guards	28·4	" "
Infantry Regiments and Depôts ..	15·1	" "

This Table shows that, as in the preceding year, the proportion of discharges for disability under one year of service was lowest in the Household Cavalry, and highest in the Foot Guards. In 1871, exclusive of the Household Troops, the Cavalry of the Line had the highest, and the Artillery the lowest proportion, while in 1870 the ratio in the Artillery was highest, and in the Infantry the lowest.

The disabilities for which these recruits were discharged are classified in the following Table :—

	Household Cavalry.	Cavalry of the Line and Cavalry Depôts.	Royal Artillery and Depot Brigade.	Foot Guards.	Regiments and Depôts.
Ague	1
Rheumatism	1	..	4
Syphilis	2	..	..	7
Tubercular Diseases	5	8	4	53
Anæmia	1	..	1
Diseases of—					
Nervous System	12	14	4	63
Eye	1	..	5
Ear	1	2	2	2
Circulatory System	8	9	5	35
Absorbent	1
Ductless Glands	1
Respiratory System	3	2	2	4
Digestive	6	9	1	10
Urinary	1	3
Generative	1	1	..	..
Locomotive	3	..	..	7
Cutaneous	1	..	..	4
General Debility	1	4	1	1	5
Accidental Injuries	2	..	1	5
Cause not stated	5	..	2
Total	1	48	54	21	213

Diseases of the nervous system have been the cause of the greatest number of discharges, the chief disability in the class being epilepsy, on account of which 52 men, or nearly one-sixth of the whole, were discharged. As formerly pointed out, this is one of the disabilities which no care on the part of the inspecting Medical Officer can detect, and which there is reason to fear is often developed by the irregularities and debaucheries of the recruits. The two other important classes were, as in the preceding year, tubercular diseases and those of the circulatory system; with the exception of one in the Cavalry and one in the Foot Guards, all the discharges for diseases of the digestive system were on account of hernia; the proportion on this account was highest in the Artillery, amounting to one-sixth of the number discharged from that arm.

If the ratio discharged be calculated on the average number of men in their first year of service, as obtained by an enumeration at the beginning and end of the year, the following are the results. The depôts are not included in this Table for reasons explained in last report.

*United
Kingdom.*

	Average No. of Men in first year of service.	No. of Men discharged in first year of service.	Ratio discharged per 1,000 serving in their first year.
Household Cavalry	125	1	8·00
Cavalry of the Line	1,952	46	23·57
Royal Artillery.. ..	2,582	37	14·33
Foot Guards	841	21	24·97
Infantry Regiments	11,616	165	14·20

The results correspond pretty closely with those obtained by calculating the ratio on the number of recruits who joined during the year. The greatest difference between the two results is observed in the case of the Cavalry; in the Foot Guards also the difference is more marked than in the Cavalry or Artillery.

II.—ON THE HEALTH OF THE TROOPS SERVING IN THE MEDITERRANEAN.

Section I.—Sickness and Mortality.

I.—GIBRALTAR.

STATISTICAL REPORT.

No change took place during the year in the corps composing the garrison. *Gibraltar.* The average strength of the troops was 4,428, the admissions into hospital were 2,996, and the deaths 26, of which two occurred out of hospital and two among invalids at Netley. These numbers give the proportion of 677 admissions, and 5·87 deaths per 1,000 of mean strength; the former nearly identical with and the latter 1·40 per 1,000 below the results of the preceding year.

The following Table shows the admissions and deaths in each corps during the year :—

Corps.	Average Annual Strength.	Admitted into Hospital.	Died.				Ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	842	796	3	1	..	4	945	4·75
Royal Engineers	290	269	3	..	1	4	925	13·79
1st Battalion 13th Regiment ..	686	267	4	..	..	4	420	6·29
28th Regiment	699	323	4	..	..	4	462	5·72
71st „	685	404	1	..	1	2	636	3·15
74th „	626	395	..	1	..	1	631	1·60
81st „	624	483	5	..	..	5	774	8·02

The other two deaths were those of a Serjeant-Major of the Army Hospital Corps, and of a Serjeant of the Army Service Corps.

The ratio of deaths was, as in the preceding year, highest in the Royal Engineers; that of the admissions was highest in the Royal Artillery.

The following Table, framed from Abstract No. 9 in the Appendix, shows the influence of the different classes of diseases in causing the sickness and mortality :—

E

Gibraltar.

Order.	Diseases.	1871. Average Strength, 4,428.				1869-70.		1871. Infantry at Home.	
		Admitted into Hospital.	Deaths.		Annual ratio per 1,000 of Strength.	Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.	
			At Gibraltar.	Of Invalids.		Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile Group ..	392	9	9	88.5	2.08	73.8	1.00	49.4
2	Constitutional „ ..	358	3	3	80.8	.68	125.5	1.99	119.6
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	36	1	1	8.1	.45	8.6	.22	8.9
2	Eye	91	..	..	20.6	..	22.2	..	16.6
3	Ear	25	..	..	5.6	..	3.4	..	3.3
4	Nose	5	..	..	1.2	..	.2	..	.3
5	Circulatory System ..	50	5	5	11.2	1.13	10.3	1.00	10.3
6	Absorbent „ ..	14	..	..	3.2	..	4.5	..	12.7
7	Ductless Glands ..	2	..	..	.6	..	..	..	.1
8	Respiratory System ..	193	3	3	43.6	.68	39.3	.78	81.5
9	Digestive „ ..	387	..	..	87.4	..	83.9	.11	85.8
10	Urinary „ ..	367	2	1	82.9	.68	76.9	.33	111.4
11	Generative „ ..	81	..	..	18.3	..	15.4	..	11.1
12	Organs of Locomotion ..	27	..	..	6.1	..	5.2	.11	4.4
13	Cellular Tissue ..	73	..	..	16.5	..	10.6	..	19.4
14	Cutaneous System ..	337	..	..	76.1	..	76.5	..	92.8
	III. Conditions, &c.								
	Debility	30	..	..	6.8	..	4.9	..	2.4
	IV. Poisons ..	18	..	..	4.1	..	14.0	.22	1.8
	V. Injuries.								
2	Accidental	507	..	..	114.5	..	72.8	.44	87.3
3	Homicidal .. ..	..	..	..	..	..	..	..	.1
4	Self-inflicted	1	1	1	.2	.22	.1	.44	.1
5	Judicial .. ..	..	..	..	..	..	.1	..	..
	VI. Surgical Operations	1	..	..	.2	..	.1	..	.2
	Cause not ascertained	..	..	..	..	..	..	..	.02
	No appreciable Disease	1	..	..	.2	..	.3	..	.7
	Total	2,996	24	226	676.6	5.87	648.6	6.64	722.0
	Average of 10 Years 1861-70	} 742.6				8.45	..	..	..

The admissions and deaths were considerably under the average of the preceding ten years.

GENERAL DISEASES were less prevalent and fatal than in the preceding year. The reduction in the admissions was manifest in both groups of those diseases; in the deaths it was confined to the constitutional, there having been an increase in those by the febrile group. The admissions and deaths by the chief diseases in this class were as follows:—

General Diseases.	Admitted.	Died.	Annual ratio per 1,000.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers	24	1	5·4	·22	1·9	..
Continued „	300	8	67·7	1·81	61·7	·88
Paroxysmal „	33	..	7·4	..	9·1	·11
Influenza	18	..	4·1	..	·2	..
Erysipelas	11	..	2·5	..	·8	..
Other diseases of this group	6	..	1·4	..	..	..
<i>Constitutional—</i>						
Rheumatism	181	..	40·9	..	37·9	·11
Syphilis	125	1	28·2	·22	75·5	..
Scrofula, Phthisis, &c.	41	2	9·3	·45	10·1	1·77
Scurvy and Purpura	1	..	·2	..	·3	..
Anæmia	7	..	1·6	..	1·7	..
Other diseases of this group	2	..	·4	..	·5	·11

Eruptive Fevers were more prevalent than in the preceding year from the occurrence of 14 cases of smallpox among the men, none of which, however, terminated fatally. This disease became epidemic among the civil population in March, and between that time and its cessation in November 243 cases were reported with 53 deaths. The 14 cases among the soldiers were pretty equally distributed in the various corps, with the exception of the 71st Regiment which escaped. Eight cases occurred among the soldiers' wives and five among the children. Of the latter two died, both infants at the breast, and one of them unvaccinated.

Continued Fevers were less prevalent, but twice as fatal, as in 1870, the excess being due to seven deaths by enteric fever, of which three occurred in the 81st Regiment, quartered at Buena Vista. The Medical Officer in charge states that no local cause of this disease could be detected.

Erysipelas was rather more prevalent than usual. Of the 11 cases, three occurred in the Royal Artillery and three in the 81st Regiment. They were with one exception mild, and could not be traced to any special cause.

Rheumatism was less prevalent than in 1870, though above the average of the Command in previous years.

Syphilis shows a very satisfactory decrease, the admissions having been less than half as numerous as in the preceding year, and greatly under the average of the Command. The reduction was shown in both the primary and secondary forms.

Scrofula, Phthisis, &c.—The admissions were very slightly under the average, but there was a marked reduction in the deaths; the numbers, however, are so small as to give rise to considerable fluctuations.

LOCAL DISEASES.—The prevalence of the different classes of local diseases has not varied much from the amount in 1870, except in diseases of the urinary system, which show a considerable increase in the admissions, confined entirely to cases of gonorrhœa. The Royal Artillery furnished a higher proportion of cases than any of the other corps.

INJURIES.—The admissions from accidental injuries were much more numerous than in 1870, and greatly above the average of a series of years. No special reason has been assigned for this. The highest proportion was furnished by the Royal Artillery, probably arising in many instances from the nature of their duties.

There was only one suicide, effected by means of cyanide of potassium.

SANITARY REPORT.

Gibraltar.

Deputy Inspector-General Bent reports :—

That there has not been any direct connection traced between sanitary defects and disease in the regimental sanitary reports, though several faulty conditions are pointed out, and improvements suggested.

These refer to—1. Insufficient ventilation and warmth in certain barracks. 2. Defective bath accommodation, and inadequate water supply. 3. Imperfect protection of the head in summer. 4. Need of a convalescent hospital.

Ventilation and Warmth.—Under these heads the Surgeons of the Royal Engineers and 28th Regiment report that the only ventilation in the lower rooms of the Town Range Barracks, when the doors and windows are closed, is by louvres above the windows, and that this is not sufficient. Moreover, that these rooms are flagged with stone, and very cold in winter. This agrees with my own observation; and I recommend the construction of fire-places, and that the shaft, which ventilates the upper story, should be carried down to the ground. The Surgeon of the 71st Highlanders remarks upon a similar feature in the South Barracks, where the top story alone has communication with the roof, and the lower rooms are only ventilated by useless louvres in the window-frames, which are closed with the windows. Here, too, are no fire-places. It has, however, been lately proposed to substitute perforated zinc plates for the upper panes in each window, which will answer the purpose; and I recommend this to be carried out without delay, and also, if possible, that fire-places be supplied.

In the Casemate Barracks fire-places are represented by the Surgeon of the 74th Highlanders as desirable, both for warmth and ventilation.

At Hargrave Barracks the Surgeon of the Royal Engineers complains of the dampness and want of space of the childrens' school-room. This defect is easily obviated by substituting an upper room for the lower one in the same building.

Bath Accommodation and Water Supply.—The Royal Artillery report states that they have but four baths in nine barracks. The report of the 28th Regiment states that there are no conveniences for washing, at Wellington Front; and the same remark applies to the 71st at South Barracks.

My own recommendation is that a shower bath and three or four foot pans should be supplied to every ablution-room. These would suffice for personal cleanliness, and, being easily filled, would be freely used by the men. The water supply is still inadequate for bath purposes, not having been fully laid on from the north front.

Head-Dress.—Surgeon-Major Lewis, Royal Artillery, reports strongly upon the unsuitableness of the present summer cap for his men, and I agree with him. A cap, with a projection to shade both the face and the back of the head, should be used, and as this applies to all the other troops in garrison, I would advise a simple straw hat, about four inches in height, with a narrow brim, strong enough to bear a roll of two yards of calico, folded turban-wise—the last six inches of which should hang over the neck. This head-dress would be at the same time light, cheap, and effective; the three chief requisites in an article which is only needed for four months in the year, but which is indispensable then.

Convalescent Hospital.—Dr. Lewis also again directs attention to the importance of providing some sort of sanitarium for convalescents from fever. Of the value of this my opinion remains unchanged. The sole alternative is the present course of invaliding all men to England whose progress to health is arrested for want of temporary change of air; a course at once tardy, costly, and often beyond the occasion.

A large number of sanitary services, chiefly of a minor character, have been performed by the Royal Engineer Department during the year 1871.

I would recommend that the question of the north front water should be settled as soon as possible, and that, if approved, no time should be subsequently lost in laying it on to the hospital, and to the different barracks which are still without it.

The vicinity of all the barracks in the command is satisfactory.

Veneral Disease.—The only local ordinance is one requiring periodical inspections of all prostitutes who are not natives of Gibraltar, and their treatment, if infected, in the Lock Hospital; a measure salutary and effective so far as it goes, but it should not be limited to one section of the class.

The ratio of venereal disease (about 16 per cent. of total sickness) is considerably below the English average—a fact that is due to the operation of the above mentioned ordinance; and there is no doubt, with a more comprehensive application of this, a still greater difference in the proportion would be shown.

Gibraltar.

II.—MALTA.

STATISTICAL REPORT.

Malta.

THERE was no change of corps in the garrison during the year. The average strength, exclusive of the Royal Malta Fencible Artillery, was 4,977; the admissions into hospital were 3,531, and the deaths 61; of the latter, five occurred out of hospital and five among the invalids on their passage home and at Netley. These numbers give the ratio of 709 admissions and 12·26 deaths per 1,000 of mean strength, the former being 50 and the latter 2·26 per 1,000 higher than in the preceding year.

The admissions and deaths in each corps were as follows;—

Corps.	Average Annual Strength.	Admitted into Hospital.	Died.				Ratio per 1,000 of Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	862	391	14	1	2	17	453	19·72
Royal Engineers	194	240	1	..	..	1	1,237	5·15
1st Battalion 24th Regiment ..	633	362	4	..	1	5	572	7·90
31st Regiment	683	352	7	..	..	7	515	10·24
48th „	709	542	8	1	..	9	764	12·69
52nd „	654	537	4	2	1	7	821	10·70
64th „	609	452	8	..	1	9	742	14·78
87th „	590	444	3	1	..	4	753	6·78

The other two deaths were those of a Serjeant-Major of the Army Hospital Corps and of a Serjeant of the Army Service Corps.

The highest ratio of admissions was in the Royal Engineers, and of deaths in the Royal Artillery.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. 9 in the Appendix; the results are shown in the following classified summary:—

Malta.

Orders.	Diseases.	1871.—Average Strength, 4,977.				1869-70.			
		Admitted into Hospital.	Deaths.			Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.	
			In Malta.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile	696	27	..	27	139·8	5·42	164·6	1·12
2	Constitutional	365	5	3	8	73·3	1·61	64·1	1·43
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	39	2	..	2	7·8	·40	8·9	·92
2	Eye	139	..	..	..	27·9	..	23·7	..
3	Ear	16	..	..	..	3·2	..	2·0	..
4	Nose	5	..	..	..	1·0	..	·4	..
5	Circulatory System ..	25	6	1	7	5·0	1·41	9·1	1·53
6	Absorbent	18	..	..	..	3·6	..	3·7	..
8	Respiratory	231	6	1	7	46·4	1·41	37·8	·81
9	Digestive	664	6	..	6	133·4	1·21	102·4	1·53
10	Urinary	196	..	..	..	39·4	..	29·0	·20
11	Generative	55	..	..	..	11·1	..	13·0	..
12	Organs of Locomotion..	20	..	..	..	4·0	..	4·8	..
13	Cellular Tissue.. ..	123	..	..	..	24·7	..	27·0	..
14	Cutaneous System ..	331	..	..	..	66·5	..	61·5	..
	III. Conditions, &c.								
	Debility.. ..	20	..	..	..	4·0	..	4·9	..
	IV. Poisons ..	92	1	..	1	18·5	·20	7·1	·61
	V. Injuries.								
2	Accidental	437	3	..	3	97·9	·60	89·8	·81
3	Homicidal	1	..	..	..	·2	..	·2	..
4	Self-inflicted	2	..	..	..	·4	..	·8	·81
5	Judicial.. ..	1	..	..	..	·2	..	..	..
	VI. Surgical Operations	..	..	..	..	..	..	·3	·10
	No appreciable disease..	5	..	..	..	1·0	..	2·2	..
	Total	3,531	56	5	61	709·3	12·26	657·3	9·87
	Average of 10 Years, } 1861-70 .. ..	..	..	..	..	798·6	13·49	..	..

The ratio of admissions and deaths was considerably under the average of the preceding 10 years, but was higher than in 1870. The excess over the latter was chiefly in febrile diseases as regards the deaths, and in diseases of the digestive system and cases returned under the head of alcoholic poisoning as regards the admissions.

GENERAL DISEASES furnished exactly the same proportion of cases as in 1870, but with rather more than double the mortality. The admissions and deaths by each of the principal diseases in this class were as follows :—

General Diseases.	1871.		Annual Ratio per 1000 of Strength.			
	Admitted.	Died.	1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers	80	12	16·1	2·41	·4	..
Continued „	576	14	115·7	2·81	156·4	·92
Paroxysmal „	14	1	2·8	·20	5·9	·20
Influenza	6	..	1·2	..	·3	..
Erysipelas	9	..	1·8	..	1·2	..
Other diseases of this group	11	..	2·2	..	·3	..
<i>Constitutional—</i>						
Rheumatism	256	..	51·4	..	45·4	..
Syphilis	67	..	13·5	..	8·9	..
Scrofula, Phthisis, &c.	34	7	6·8	1·41	8·2	1·12
Scurvy and Purpura .. .. .	..	..	..	..	·2	..
Anæmia	6	..	1·2	..	·8	..
Other diseases of this group	2	1	·4	·20	·6	·20

Eruptive Fevers were greatly in excess of former periods owing to an outbreak of smallpox as an epidemic. There were 66 admissions and 12 deaths by this disease, and there were 10 admissions by cowpox. Smallpox had been prevalent on the shores of the Mediterranean during the autumn of 1870, and appeared among the civil population of Malta in October. The first case among the troops occurred in the 87th Regiment on the 3rd of January, 1871. The 48th Regiment had much the largest number of admissions, they having amounted to 24, of which three proved fatal. The 1st Battalion 24th Regiment alone escaped without a case. All the men admitted are stated to have borne marks of vaccination, except one of the Royal Artillery who recovered, and one of the 52nd who bore marks of previous smallpox, and in whom the disease was confluent and terminated fatally. The proportion of deaths was extremely high considering that the men were thus protected.

During the epidemic four officers and nine children were attacked, all of whom recovered, and three women, one of whom died. Unfortunately no returns have been furnished to us of the progress of the disease among the civil population, but it is stated to have been very wide-spread and very fatal, especially in the more crowded parts of the town.

Continued Fevers were rather less prevalent but much more fatal than in the preceding year, the ratio of deaths having been more than doubled. The 48th Regiment, in Floriana Barracks, had the highest ratio of admissions, and next to it the 64th Regiment at Isola Gate, with detachments at San Francisco and Polverista, but in neither of these did the amount of fever at all approach what occurred in the earlier years of the last decade. The admissions from the 87th Regiment quartered in the Lower St. Elmo Barracks, formerly so unhealthy, were only in the ratio of 81 per 1,000. The Royal Artillery had the highest proportion of deaths by this type of fever, amounting to 4·64 per 1,000 of mean strength.

Rheumatism was less prevalent than in 1870, but differed little from the average of previous years.

Syphilis shows an increase upon the proportion in 1870, but the results are still very satisfactory compared with other Commands or with previous periods in Malta; the admissions by the primary forms having been only 8·3, and by the secondary 5·2 per 1,000.

Scrofula, Phthisis, &c., were rather less prevalent and fatal than in 1870,

Malta.

but the difference is probably the result of the fluctuations dependent upon small numbers under observation.

LOCAL DISEASES.—There was a marked increase in the admissions by *diseases of the digestive system*, chiefly in cases of tonsillitis, dyspepsia and *tænia solium*. The two former were not specially prevalent in any corps, but of 67 cases of *tænia solium* 63 occurred in the 52nd Regiment. The Medical Officer in charge does not assign any reason for the great prevalence of this parasite in the corps.

POISONS.—The admissions under this head were much higher than in 1870, but this arose from the Medical Officer in charge of the Royal Artillery having returned 48, and the Medical Officer of the 1st Battalion 24th Regiment 18 admissions under the head “alcohol.” These cases were probably men suffering from the effects of a debauch, and cannot properly be classed under the head of *poisons*. If they are omitted, the admissions by this class only amount to 26 or 5·2 per 1,000 of the strength, being slightly under the proportion in the preceding year.

INJURIES.—The admissions from accidents corresponded closely with the results for the preceding year. There were no suicidal deaths.

ROYAL MALTA FENCIBLE ARTILLERY.

The average strength of this corps for the year was 563; the admissions into hospital from it were 452, and the deaths were three. These numbers give the ratio of 803 admissions and 5·31 deaths per 1,000 of the mean strength, the former under and the latter above the ratios in 1870, but both under the average of the last 10 years.

The following Table framed from Abstract No. 9 in the Appendix, shows the admissions and deaths by the different classes of diseases :—

Orders.	Average Strength.	Royal Malta Fencible Artillery.						Annual Ratio per 1,000 of Strength.	
		503		Annual Ratio per 1,000.				Line Regiments at Malta. 1871.	
				1871.		1869-70.			
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	
I. General Diseases.									
1	Febrile Group	45	1	79.9	1.77	52.0	.90	139.8	5.42
2	Constitutional „	50	1	88.8	1.77	75.8	.90	73.8	1.61
II. Local Diseases.									
Diseases of the—									
1	Nervous System	6	..	10.7	..	12.6	.90	7.8	.40
2	Eye	91	..	161.6	..	113.9	..	27.9	..
3	Ear .. ..	..	..	..	..	1.8	..	3.2	..
4	Nose	1	..	1.8	..	.9	..	1.0	..
5	Circulatory System .. ..	..	1	..	1.77	6.8	..	5.0	1.41
6	Absorbent „	3	..	5.8	..	.9	..	3.6	..
8	Respiratory „	16	..	28.4	..	75.3	..	46.4	1.41
9	Digestive „	101	..	179.4	..	186.5	1.79	133.4	1.21
10	Urinary „	51	..	90.6	..	47.5	..	39.4	..
11	Generative „	4	..	7.1	..	5.4	..	11.1	..
12	Organs of Locomotion .. ..	..	..	..	..	5.4	..	4.0	..
13	Cellular Tissue	20	..	85.5	..	36.8	..	24.7	..
14	Cutaneous System	49	..	87.0	..	130.9	..	66.5	..
III. Conditions, &c.									
	Debility	1	..	1.8	..	2.7	..	4.0	..
IV. Poisons									
		1	..	1.8	..	1.8	..	18.5	..
V. Injuries.									
2	Accidental	13	..	23.1	..	59.2	..	97.9	.60
3	Homicidal .. ..	..	..	..	..	..	..	.2	..
4	Self-inflicted .. ..	..	..	..	..	.9	..	.4	..
5	Judicial.. ..	..	..	..	..	..	..	.2	..
VI. Surgical Operations									
	No appreciable disease .. ..	..	..	..	..	.9	..	1.0	..
	Total	452	3	802.8	5.31	817.0	4.49	709.3	12.26
	Average of 10 years 1861-70..	..	..	850.8	8.88	..	..	..	..

GENERAL DISEASES furnished a higher ratio of admissions than in 1870, though considerably under the average of previous years; the excess was chiefly in cases of continued fever. Six cases of smallpox occurred during the epidemic, of which one terminated fatally; it was of the hæmorrhagic form, and the man bore satisfactory marks of vaccination. The cases of continued fevers were mostly returned under the head of *febricula*, and were attributed to the heat of the summer. There was a slight increase in the constitutional group, chiefly in cases of syphilis, the admissions by which were in the ratio of

Malta.

42·6 per 1,000 of the strength, or nearly three times as high as among the rest of the troops.

LOCAL DISEASES.—Those of the *eye* gave rise to a very high proportion of admissions, in fact they caused one-fifth of all the admissions into hospital. Ophthalmia was most prevalent during the latter half of the year. The greatest number of cases occurred among the men quartered in St. Elmo Gate barrack, and the disease was believed by the Medical Officer in charge to have been a result of the defective ventilation and dampness of the quarters.

There was a considerable increase of the admissions by *diseases of the urinary system*, owing to the prevalence of gonorrhœa among the young soldiers of the corps, the cases being stated to have occurred chiefly among the men under two year's service.

SANITARY REPORT.

Inspector-General Paynter, C.B., in his sanitary report, again adverts to the practice of excessive drinking as a fertile cause of disease and mortality in the garrison.

The following are the causes of diseases referred to in the different Regimental Reports, viz., badly-constructed and ill-ventilated barrack-rooms; dampness of rooms in winter, without means of warming and drying them; insufficient water for flushing purposes; badly-constructed latrines and urinals, with very defective drainage and sewerage; and insufficient lavatory and bath accommodation. Some of the regimental medical officers attribute the attacks of disease, which have occurred during the year in question, to the climate of Malta; but Inspector-General Paynter considers the climate during the year to have been a healthy one, excepting during a few weeks in the autumn, when a succession of "Sirocco" winds prevailed, which were at times very depressing. The selected sites on which barracks are built, and the insanitary condition of the vicinities of barracks, are prejudicial to health. The barrack-rooms, as a very general rule, are insufficiently lighted by day, for want of ample window space. Guard-rooms, "lock-up" rooms and cells, in several instances, are too small, with insufficient light and ventilation; and the canteens attached to some of the barracks are very small, dark, damp, and insufficiently ventilated.

Such are some of the most prominent causes to which attacks of diseases may be attributed; but where so many exist it is extremely difficult to select any one, or even two, as being the most evident.

The most important sanitary improvements which demand attention are—the securing an abundant supply of pure water for drinking and cooking purposes, as well as a plentiful supply for flushing latrines, urinals and sewers, as also a sufficient quantity for the supply of the lavatories and baths. Each barrack-room should be supplied with filters, sufficient for insuring filtered water for all its occupants. The barrack accommodation demands serious consideration, for, with the exception of St. Francis barrack-rooms at Floriana and those at St. James' Cavalier and Pembroke Camp, nearly all the barrack-rooms in the command are ill-constructed, dark, and ill-ventilated. Every barrack-room should have a fire-place, with an allowance of fuel granted during the winter months, in order to keep it free from damp, and assist in ventilating it. In some barracks, such as Fort Manoel, for instance, quarters for married soldiers are urgently required. The barrack-rooms in the command have not been overcrowded during the year. Wooden huts should not be used as dwellings, they are too hot in summer and too cold and damp in winter. Many of the guard-rooms, cells, and "lock-up" rooms require attention as regards size, light and ventilation. Properly constructed latrines and urinals, with continuous flushing pipes fixed to the latter, are required in many of the barracks, with sewers, &c., leading from them.

Satisfactory hospital accommodation for the sick, in this command, is a very prominent requirement. Nothing could be worse than the present buildings or the sites on which some of them are placed. There ought to be

not only good hospital accommodation for the soldier, with wards separated from the main building, for contagious affections, &c., &c., but in a large command like this, hospitals should be erected for officers, and others for women and children.

The year 1871 has been a healthy one; and in so far as the admissions into hospital with attacks of fever are concerned, a more healthy year than that of 1870; but the deaths consequent on these attacks were double those of 1870.

Inspector-General Paynter believes that the very satisfactory state of health which has obtained amidst the troops in the command has resulted, in a very great measure, from the orders which were given by his Excellency the General Commanding, that all fatigues, drills, and working parties, save those absolutely necessary, should cease during the hot season; and more especially that troops occupying certain barracks should sleep under canvas during the same season.

Indeed, so long at the barrack-rooms in the command are as indifferent as they for the most part are, he believes that if every man slept in the open air throughout the hot season, the health of the troops would be found far more satisfactory than occupying the rooms at night.

The leading and more prominent sanitary improvements which have been effected since the end of 1870 are the following:—

"*Fort Lascaris*."—Flushing pipes have been fixed to urinals.

"*Fort Ricasoli*."—Preparations are making to erect a "lock-up" room for prisoners. New married quarters are in progress of erection. Tailors' and shoemakers' shops have been erected.

"*Fort St. Angelo*."—New latrines and urinals are being erected.

"*Fort Verdala*."—Several rooms, in addition to those improved in 1869, have been far better ventilated. The cells have been improved as regards light and ventilation. A "lock-up" room has been made. Water-closets and urinals have been erected for the mess servants.

"*St. Elena Gate*."—New latrines and urinals have been erected, and a new lavatory is in progress of erection.

"*Isola Gate*."—An old latrine has been removed, and a "jalousie" been fitted to cook-house window.

"*San Francesco di Paolo*."—Fire-places have been erected in some of the married quarters.

"*St. Clement's Bastion*."—New latrines and urinals are being erected.

"*Fort Manoel*."—Glass windows have been furnished to No. 1 room. New cooking apparatus has been supplied to the cook-house.

Section II.

On the Extent of Invaliding among the Troops serving in the Mediterranean.

There were 155 invalids sent home from Gibraltar, and 133 from Malta, being in the ratio of 35.0 and 26.7 per 1,000. At Netley there were 94 invalids from Gibraltar and 79 from Malta discharged during the year, being respectively 21.2 and 15.9 per 1,000 of mean strength—both considerably under the proportion in the preceding year.

The following Table, framed from Abstract No. 9 in the Appendix, shows the classes of diseases by which this loss was caused:—

Malta.

	Invalids sent home from			Invalids discharged at Netley from		
	Gibraltar.	Malta.	Total.	Gibraltar.	Malta.	Total.
Continued Fevers	9	3	12	..	..	..
Rheumatism	23	19	42	8	4	12
Syphilis	2	4	6	2	2	4
Scrofula, Phthisis, and Hæmoptysis ..	21	28	49	28	29	57
Other general diseases	5	2	7	2	1	3
Diseases of the—						
Nervous System	12	7	19	8	2	10
Eye and Ear	15	7	22	6	7	13
Circulatory System	19	8	27	19	7	26
Respiratory	11	17	28	2	5	7
Digestive	12	15	27	7	13	20
Urinary	3	4	7	2	5	7
Generative	2	..	2	1	1	2
Organs of Locomotion	1	3	4	2	..	2
Cellular Tissue .. .. .	..	1	1	1	..	1
Cutaneous System	5	2	7	..	2	2
Debility	10	9	19	2	1	3
Accidental injuries	5	3	8	4	..	4
Self-inflicted .. .. .	..	1	1	..	..	..
Total	155	133	288	94	79	173
Ratio per 1,000 of { 1871	35·0	26·7	30·6	21·2	15·9	18·4
Mean Strength " { 1861-70	29·0	22·3	25·5	21·0	16·5	18·6

The numbers sent home as invalids from both Gibraltar and Malta were above the average of the preceding ten years, but this was probably the result of the increased opportunities of sending men home. The numbers finally discharged the service at Netley corresponded very closely with the average. Tubercular diseases were the most frequent cause of invaliding and of final discharge. Next to them were rheumatism and diseases of the respiratory, digestive and circulatory systems as causes for sending home invalids, and of the circulatory and digestive systems as causes of final discharge.

*Section III.**Mean Daily Sick.*

The average number constantly non-effective from sickness during the year was 135 in Gibraltar and 164 in Malta, exclusive of the Royal Malta Fencible Artillery, being respectively 30·49 and 32·95 per 1,000 of mean strength, results corresponding very closely with those of the preceding year.

The following Table gives the usual information on the subject based on these numbers :—

Malta.

	Gibraltar.	Malta, exclusive of Royal Malta Fencibles.	United Kingdom. Infantry Regiments. Average of ten years, 1861-70.
Average Strength in 1871 ..	4,428	4,977	
Average constantly sick ..	135	164	
Ratio per 1,000 con- stantly sick { 1871 ..	30·49	32·95	..
{ 1861-70..	36·57	43·31	40·52
	days	days	days
Average sick time to { 1871 ..	11·13	12·03	..
each Soldier { 1861-70..	13·66	15·81	14·79
Average duration of { 1871 ..	16·45	16·95	..
the cases { 1861-70..	18·39	19·81	18·87

The proportion constantly sick, the sick time to each soldier, and the duration of the cases, have been much under the average of the last ten years, both at Gibraltar and Malta, but the improvement has been most marked at the latter.

Section IV.

On the Influence of Age on the Mortality.

The ages of the troops serving in the Mediterranean during the year and the deaths at each age in quinquennial periods are stated in Abstract No. 10 in the Appendix ; the results are shown in the following Table :—

	Ratio of deaths per 1,000 of strength at each period of life.					
	Under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and upwards.
Mediterranean { 1871 ..	5·38	6·49	7·38	13·85	12·45	21·68
Commands.. { 1861-70	3·71	5·86	11·48	13·71	25·99	34·63

III.—ON THE HEALTH OF THE TROOPS SERVING IN THE DOMINION OF CANADA.

Section I.

Sickness and Mortality.

STATISTICAL REPORT.

Dominion of Canada.

In the end of November, the 8th Company Royal Engineers embarked for Bermuda, and the 78th Regiment for England. No other change took place in the composition of the Force, but towards the end of the year the troops were withdrawn from Canada and concentrated at Halifax.

The average strength during the year was 2,383, the admissions into hospital were 1,620, and the deaths 18, of which four occurred out of hospital, and one among the invalids sent to Netley. These numbers give the proportion of 680 admissions and 7·55 deaths per 1,000 of mean strength; the former slightly above, and the latter below the results of the preceding year.

The sickness and mortality in each of the corps were as follows :—

	Average Annual Strength.	Admitted into Hospital.	Deaths.				Annual ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery ..	304	200	3	1	..	4	658	13·16
Royal Engineers ..	188	132	..	1	..	1	702	5·32
1st Bn. 60th Foot ..	690	417	4	1	..	5	604	7·25
61st Foot ..	598	396	2	1	..	3	662	5·02
78th „ ..	570	463	3	..	..	3	812	5·26

The other two deaths were those of a Corporal of the Army Hospital Corps who committed suicide at Halifax, and of a Private of the Rifle Brigade who had been sent as an invalid to Netley in the preceding year.

The following table shows the admissions and deaths by the different classes of diseases; the details are given in Abstract No. 11 in the Appendix :—

Orders.	Diseases.	Strength, 2,383.				1871.		1869-70.		Dominion of Canada.
		Admissions.	Deaths.			Annual Ratio per 1,000.		Annual Ratio per 1,000.		
			In Dominion of Canada.	Of Invalids.	Total.	Admissions.	Deaths.	Admissions.	Deaths.	
I. General Diseases.										
1	Febrile Group ..	77	1	..	1	32·3	·42	39·8	·51	
2	Constitutional „ ..	307	1	..	1	128·8	·42	115·4	1·46	
II. Local Diseases.										
Diseases of the—										
1	Nervous system ..	34	3	..	3	14·3	1·26	9·1	·95	
2	Eye	18	..	..	..	7·6	..	15·2	..	
3	Ear	2	..	..	..	·8	..	2·6	..	
4	Nose	3	..	..	..	1·3	..	·5	..	
5	Circulatory system ..	17	2	..	2	7·1	·84	5·9	1·54	
6	Absorbent „ ..	39	..	..	..	16·4	..	17·1	..	
7	Ductless Glands..	..	..	..	..	..	..	·1	..	
8	Respiratory system ..	188	4	..	4	78·9	1·67	68·2	1·39	
9	Digestive „ ..	221	1	..	1	92·8	·42	69·9	·44	
10	Urinary „ ..	170	1	..	1	71·3	·42	86·7	·37	
11	Generative „ ..	34	..	..	..	14·3	..	10·5	..	
12	Organs of Locomotion ..	12	..	1	1	5·0	·42	3·8	·07	
13	Cellular Tissue ..	50	..	..	..	21·0	..	21·0	·07	
14	Cutaneous system ..	165	..	..	..	69·2	..	49·1	..	
III. Conditions, &c.										
	Debility	25	..	..	..	10·5	..	2·6	..	
IV. Poisons										
	.. ..	19	1	..	1	8·0	·42	10·7	·29	
V. Injuries.										
2	Accidental	236	1	..	1	99·0	·42	80·8	·95	
3	Homicidal	1	1	..	1	·4	·42	·1	·07	
4	Self-inflicted	1	1	..	1	·4	·42	·2	·59	
VI. Surgical Operations										
	.. ..	1	..	..	..	·4	..	·3	..	
No appreciable disease ..										
	.. ..	..	..	..	..	..	..	1·0	..	
Total		1,620	17	1	18	679·8	7·55	610·6	8·70	
Average of 10 years, } 1861-70.. ..		..	..	..	..	646·6	9·01	..	..

GENERAL DISEASES were rather more prevalent but less fatal than in the preceding year. The increase was confined to the constitutional group, there having been a slight decrease in the febrile.

The prevalence and mortality of the principal diseases comprised in this class were as follows :—

*Dominion of
Canada.*

Diseases.	Admitted.	Died.	Ratio per 1,000 of Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers	8	..	3·3	..	2·4	·07
Continued	19	1	8·0	·42	20·2	·29
Paroxysmal	4	..	1·7	..	6·2	..
Influenza	33	..	13·8	..	5·9	..
Erysipelas	13	..	5·5	..	4·6	·07
Other Diseases of this group ..	..	..	..	..	·4	·07
<i>Constitutional—</i>						
Rheumatism	114	..	47·8	..	33·9	..
Syphilis	177	..	74·3	..	73·1	..
Scrofula, Phthisis, &c. ..	13	1	5·5	·42	6·1	1·24
Scurvy and Purpura	1	..	·4	..	·8	..
Anæmia	1	..	·4	..	·4	..
Other Diseases of this group ..	1	..	·4	..	1·1	·15

Eruptive Fevers were rather more prevalent than in 1870, from the occurrence of some cases of scarlet fever at Halifax. There was no case of small-pox.

There was a marked exemption from *continued* and *paroxysmal fevers*, to some extent counterbalanced by an increase in the cases of *influenza*.

The principal increase in the admissions by this class was caused by *rheumatism*. The ratio of cases of *syphilis* was identical with that of the preceding year.

LOCAL DISEASES.—Those of the *eye* and of the *absorbent system* were much less prevalent than in 1870, while there was an increase in those of the *circulatory, urinary, and cutaneous*, but in none of these to such an extent as to call for special explanation as to the causes.

INJURIES.—There were three deaths included in this class—one by a railway accident, one by suicide in a man suffering from delirium tremens, and one homicidal, the result of a severe wound inflicted on a man's head by a prostitute.

SANITARY REPORT.

Deputy Inspector-General Lloyd reports :—

The health of the troops throughout the command has been favourably reported on by the Regimental Medical Officers. There has been but little serious disease, and no special causes of sickness have been reported. The Surgeon of the Royal Artillery states that the ventilation is defective, and that the amount of cubic space is rather limited in the Artillery Barracks, but no bad effects have resulted. My own opinion of the climate is very favourable. That it is exceedingly changeable and disagreeable in the winter and spring must be admitted, but with ordinary precautions a high standard of health may be maintained.

The principal sanitary defects in the garrison at Halifax are the existence of cess-pit privies at the Royal Artillery and Royal Engineer quarters, and the want of detached wards for the treatment of epidemic and infectious diseases. I would strongly recommend the removal of the cess-pit privies and the substitution of some modern form of latrine, such as those in Wellington Barracks,

and that the Royal Artillery quarters be enlarged, and provided with better means of ventilation. *Dominion of Canada.*

I consider it also most advisable that wards be erected for the separate treatment of cases of epidemic and infectious diseases, both for women and children as well as the men.

Section II.

On the Extent of Invaliding.

There were 42 invalids sent to England during the year, and there were 37 discharged the service, 16 in Canada and 21 at Netley. The invalids sent home therefore were in the ratio of 17·6, and those finally discharged 15·5 per 1,000 of mean strength. The following Table, framed from Abstract No. 11 in the Appendix, shows the classes of diseases by which the invaliding was caused :—

Disabilities.	Invalids sent home.	Invalids Discharged the Service.	
		In Canada.	At Netley.
Rheumatism	5	..	..
Syphilis	6	..	4
Scrofula and Phthisis	6	1	6
Diseases of the—			
Nervous System	5	2	..
Eye and Ear .. .. .	..	1	1
Circulatory System	5	2	3
Respiratory	3	3	..
Digestive	2	4	1
Generative	1	..	1
Organs of Locomotion	2	1	3
Cutaneous System	1	..	1
Debility	4	1	..
Accidental Injuries	1	1	1
Surgical operations	1	..	..
Total	42	16	21
Ratio per 1,000 of Mean { 1871 ..	17·6	6·7	8·8
Strength { 1861-70.	15·9	2·3	10·5

The invaliding has been slightly above the average of the last 10 years. Scrofula and phthisis, and syphilis have been the most frequent causes of disability.

Section III.

Mean Daily Sick.

The average number constantly non-effective from sickness during the year was 79, being in the ratio of 33·15 per 1,000 of the strength, and rather above the average of the Command. The following Table gives the usual information on the subject :—

F

*Dominion of
Canada.*

	1871.	1861-70.
Ratio per 1,000 of strength constantly sick ..	88·15	80·36
Average sick time to each soldier ..	days. 12·10	days. 11·08
Average duration of the cases of disease ..	17·80	17·14

There has been an increase in all the particulars on the results for 1870, and also for the last 10 years. It is not improbable, however, that this may be a result of the concentration of the troops, as under the previous system it was almost impossible to include the sick of all the scattered detachments.

Section IV.

On the influence of Age on the Mortality.

The following Table, framed from Abstract No. 12 in the Appendix, shows the ratio of mortality of the troops serving in the Command at each age in quinquennial periods :—

	Under 20	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and upwards.
Ratio of Deaths per 1,000 of mean strength						
1871 ..	..	2·25	6·00	10·82	16·57	45·25
1861-70	3·47	6·01	9·80	11·13	17·66	20·23

The results have not differed more from the average than might be expected with limited numbers. Taking the average of the last ten years the results at each age correspond very closely with those of regiments serving in the United Kingdom during the same period.

IV. ON THE HEALTH OF THE TROOPS SERVING IN BERMUDA.

*Section I.**Sickness and Mortality.*

STATISTICAL REPORT.

THE 8th Company Royal Engineers arrived from Canada on the 1st December. There was no other change in the composition of the garrison. The average strength of the troops during the year was 1,733, the admissions into hospital were 1,162, and the deaths amounted to 31, of which seven took place out of hospital and three among invalids on their passage home or at Netley. The ratio of admissions therefore was 670, and of deaths 17·88 per 1,000 of mean strength, the former being considerably lower and the latter nearly one-half higher than in 1870.

Bermuda.

The sickness and mortality in the different corps were as follows :—

	Average Annual Strength.	Admitted into Hospital.	Died.				Ratio per 1,000 of Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery.. ..	156	80	2	2	..	4	513	25·64
„ Engineers	272	236	1	4	..	5	868	18·38
53rd Regiment.. ..	623	465	10	..	8	18	746	20·87
69th „	645	866	6	..	..	6	567	9·30

The other three deaths were those of a private of the 61st Regiment, who was left behind, labouring under consumption, when the corps embarked for Halifax, and of a Serjeant and private of the Army Service Corps.

The influence of the different classes of diseases in causing sickness and mortality is shown in the following Table framed from Abstract No. 11 in the Appendix :—

Bermuda.

Orders.	Diseases.	1871. Average Strength, 1,733.						1869-70.	
		Admitted into Hospital.	Deaths.			Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.	
			At Bermuda.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
I. General Diseases.									
1	Febrile Group ..	124	5	..	5	71·5	2·89	129·4	4·02
2	Constitutional „ ..	131	8	2	10	77·3	5·77	82·2	1·54
II. Local Diseases.									
Diseases of the—									
1	Nervous system ..	18	1	1	2	10·4	1·15	10·8	1·03
2	Eye	30	..	..	..	17·3	..	34·9	..
3	Ear	6	..	..	..	3·5	..	4·4	..
4	Nose .. ..	..	..	..	..	..	..	·3	..
5	Circulatory system ..	15	2	..	2	8·7	1·15	9·2	1·23
6	Absorbent „ ..	16	..	..	..	9·2	..	10·8	..
8	Respiratory	60	1	..	1	34·6	·58	50·8	..
9	Digestive „ ..	269	2	..	2	155·2	1·15	175·4	1·54
10	Urinary „ ..	65	..	..	..	37·5	..	31·1	·77
11	Generative „ ..	16	..	..	..	9·2	..	10·0	..
12	Organs of Locomotion ..	1	..	..	..	·6	..	2·6	..
13	Cellular Tissue ..	73	..	..	..	42·1	..	17·2	·26
14	Cutaneous system ..	102	1	..	1	58·9	·58	95·8	..
III. Conditions, &c.									
	Debility	15	..	..	..	8·7	..	11·5	..
IV. Poisons ..									
		16	3	..	3	9·2	1·73	24·6	1·03
V. Injuries.									
2	Accidental. . . .	200	3	..	3	115·4	1·73	117·9	2·05
4	Self-inflicted	2	2	..	2	1·2	1·15	·3	1·54
VI. Surgical Operations..									
		..	..	..	..	..	..	·3	..
	Total	1,162	28	3	31	670·5	17·88	819·5	15·66
	Average of 10 years 1861-70	..	..	..	..	764·3	29·02	..	..

GENERAL DISEASES.—There was a marked reduction in the prevalence of this class, but the mortality by it was double that of the preceding year. The decrease in the admissions was much more marked in the constitutional than in the febrile group, and the increase in the mortality was almost entirely confined to the former. The admissions and deaths by the principal diseases in this class were as follows :—

Bermuda.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Continued Fevers	97	5	56·0	2·89	113·2	4·62
Paroxysmal „	2	..	1·1	..	1·5	..
Influenza	24	..	13·8	..	13·9	..
Erysipelas	1	..	·6	..	·5	..
Other diseases of this group ..	..	..	..	..	·3	..
<i>Constitutional—</i>						
Rheumatism	57	..	32·9	..	42·9	..
Syphilis	55	1	31·7	·58	29·3	..
Scrofula, Phthisis, &c. ..	21	9	12·1	5·19	9·1	1·29
Other Diseases of this group ..	1	..	·6	..	·8	·25

Continued Fevers were only half as prevalent as in 1870, but there was no corresponding decrease in the mortality. Three of the five deaths by enteric fever occurred at Ireland Island in a detachment which had just arrived there from Warwick, where the men had been going through a course of musketry instruction. No local cause of disease could be discovered.

Syphilis.—There was a reduction to the extent of one-fourth in the admissions by this disease, the decrease being entirely in the primary form.

Scrofula, phthisis &c., were slightly more prevalent than in the preceding year, but the deaths were thrice as numerous. This may possibly have been an accidental fluctuation resulting from the small numbers under observation.

LOCAL DISEASES.—There was a considerable reduction in the admissions by *diseases of the eye* and of the *respiratory* and *cutaneous systems*, but the decrease in the last was counterbalanced by an increase in abscesses of the *cellular tissue*.

INJURIES.—There were three accidental deaths by drowning, and two suicidal, one by cut-throat and the other by poisoning by cyanide of potassium.

SANITARY REPORT

Deputy Inspector-General Bowen reports that the troops in Bermuda have been remarkably healthy, and he is unable to point to anything in the sanitary condition of camps or quarters that has obviously caused disease.

Great care has been taken from the very commencement of the hot weather to cause as much room as possible in barracks by encamping the men; the plan of clearing out the rooms *seriatim*, for a fortnight each, was again put in practice; and every man had, as nearly as practicable, 1,000 cubic feet of space at night during the summer and autumn.

There has been some diminution in the admissions into hospital for diseases caused indirectly by intemperance, which is considered to be mainly attributable to the short residence of the troops now in Bermuda, and to some limitation being put upon the sale of spirits in the canteen.

Among the sanitary improvements effected during the year are the following:—

The old barrack at Watford Island has been converted into an hospital. This is very important, in case of fevers, which will not in future be

Bermuda. admitted into the naval hospital. Additional small wards at the hospital at Prospect are in course of construction, and are much needed.

Deputy Inspector-General Bowen strongly recommends the use of kerosene or "coal oil," for lighting the hospitals in the Command, the present system and allowance of candles being quite inadequate. Extra light has always to be drawn. The use of coal oil was found most advantageous in Canada, and it is an article in constant use in almost every house and public building in Bermuda.

Venereal disease is rare in the island.

Section II.

On the Extent of Invaliding.

There were 45 invalids sent home during the year from Bermuda, and 28 finally discharged the service, being in the ratio of 26 and 16·2 per 1,000 of mean strength, both considerably above the average.

The following Table, framed from Abstract No. 11 in the Appendix, shows the classes of diseases by which the invaliding was caused :—

Disabilities.	Invalids sent Home.	Discharged the Service at Netley.
Rheumatism	3	3
Syphilis	1	..
Scrofula and Phthisis	9	10
Chronic Osteo-Arthritis	1	..
Diseases of the—		
Nervous System	6	2
Eye	4	1
Circulatory system	4	3
Respiratory „	4	3
Digestive „	5	1
Urinary „	1	..
Organs of Locomotion	1	2
Debility	2	..
Accidental injuries.. .. .	4	2
Surgical operations .. .. .	..	1
Total	45	28
Ratio per 1,000 of strength { 1871	26·0	16·2
{ 1861-70	20·6	13·2

Scrofula and phthisis have been the most frequent causes of disability, and next to them diseases of the brain. Of the six cases sent home from the latter cause, four were returned as dementia, and were probably, to a great extent the result of intemperance, for which unfortunately the facilities in these islands are very great.

Section III.

Mean Daily Sick.

The average number constantly non-effective from sickness throughout the year was 54, being in the ratio of 31·16 per 1,000 of mean strength, and con-

siderably lower than in the preceding year. The following Table gives the results of the usual calculations based on this number :— *Bermuda.*

	1871.	1861-70.
Ratio per 1,000 of strength constantly Sick ..	81·16	39·54
Average Sick time to each Soldier	days. 11·36	days. 14·43
Average duration of the cases of Disease ..	16·96	15·00

The results for 1871 show a marked reduction in all these particulars compared with the average of the 10 preceding years ; indeed they were lower than for troops in the Dominion of Canada during the same year.

Section IV.

On the Influence of Age on the Mortality.

The following Table shows the influence of age, in quinquennial periods, on the mortality of the troops serving in Bermuda. The details are given in Abstract No. 12 in the Appendix :—

	Under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and upwards.
Ratio of deaths } 1871 .. ..	..	11·80	6·68	29·24	56·73	..
per 1,000 of } 1861-70 ..	6·91	13·23	23·53	22·33	41·53	7·58
mean strength						

V.—ON THE HEALTH OF THE TROOPS SERVING IN THE WEST INDIES.

Section I.

Sickness and Mortality.

I. WINDWARD AND LEEWARD COMMAND.

STATISTICAL REPORT.

1. WHITE TROOPS.

*Windward
and Leeward
Command.*

THE white troops employed in this Command during the year consisted of a Battery of Royal Artillery, six Companies of the 29th Regiment, a few European non-commissioned officers of the West India Regiment, and a few men of the Army Hospital Corps. Their average strength for the year was 670; the admissions into hospital among them were 539 and the deaths 2, including one of an invalid, at Netley, being in the ratio of 804 and 2·98 per 1,000 of mean strength. The admissions were 122, and the deaths 12½ per 1,000 under the ratio of the preceding year.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. 13 in the Appendix; the classified results are shown in the following Table:—

*Windward
and Leeward
Command.*

Orders.	Diseases.	1871.					1869-70.		
		Strength, 670.				Ratio per 1,000.		Ratio per 1,000.	
		Admitted.	Died.			Admitted.	Died.	Admitted.	Died.
			In the Command.	Of Invalids.	Total.				
	I. General Diseases.								
1	Febrile Group	53	..	..	..	79.1	..	295.2	3.63
2	Constitutional "	56	..	1	1	83.6	1.49	127.6	3.02
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	5	..	..	..	7.4	..	10.9	1.22
2	Eye	8	..	..	..	11.9	..	18.1	..
3	Ear	2	..	..	..	3.0	..	13.3	..
4	Nose.. ..	..	..	..	..	..	..	1.2	..
5	Circulatory System ..	6	..	..	..	9.0	..	6.1	1.81
6	Absorbent	16	..	..	..	23.9	..	21.8	..
8	Respiratory	14	..	..	..	20.9	..	42.3	..
9	Digestive	54	..	..	..	80.6	..	87.1	.60
10	Urinary	141	..	..	..	210.4	..	107.7	..
11	Generative	8	..	..	..	11.9	..	6.1	..
12	Organs of Locomotion	3	..	..	..	4.5	..	2.4	..
13	Cellular Tissue ..	15	..	..	..	22.4	..	33.3	..
14	Cutaneous System ..	58	..	..	..	86.6	..	105.3	..
	III. Conditions, &c.								
	Debility	6	..	..	..	9.0	..	1.2	..
	IV. Poisons ..	24	..	..	..	35.8	..	22.4	..
	V. Injuries.								
2	Accidental	69	..	..	..	103.0	..	99.2	..
4	Self-inflicted ..	..	1	..	1	..	1.49	.6	..
	VI. Surgical Operations..	..	..	..	..	..	..	.6	..
	No appreciable disease	1	..	..	..	1.5	..	.6	..
	Total.. ..	539	1	1	2	804.5	2.98	1003.0	10.28
	Average of 10 years 1861-70 ..	..	..	..	..	1181.7	13.04	..	..

Both admissions and deaths were much under the average of the preceding ten years.

GENERAL DISEASES were scarcely half as prevalent, and only about one-seventh as fatal as in 1870. The reduction was almost entirely in the febrile group. The influence of the principal diseases comprised in both groups of this class is shown in the following Table :—

Windward
and Leeward
Command.

General Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Continued Fevers	84	..	50·7	..	199·6	1·81
Yellow Fever .. ..	..	..	..	..	12·1	1·81
Paroxysmal Fevers.. ..	13	..	19·4	..	78·7	..
Influenza	1	..	1·5	..	3·6	..
Erysipelas	1	..	1·5	..	1·2	..
Other Diseases of this group	4	..	6·0	..	..	..
<i>Constitutional—</i>						
Rheumatism	8	..	11·9	..	17·5	..
Syphilis	43	..	64·2	..	91·4	..
Scrofula, Phthisis, &c. ..	5	1	7·5	1·49	12·1	2·42
Anæmia .. ..	..	..	..	..	3·0	..
Other Diseases of this group	..	..	..	..	3·6	..

There were no cases of *eruptive fevers* among the troops. The admissions by *continued fevers* amounted to only one-fifth of the ratio of the preceding year, and none of the cases terminated fatally. There were no cases of yellow fever during the year.

Paroxysmal Fevers were more prevalent than in 1870, but were greatly under the average of the last two years.

Rheumatism gave rise to a very small amount of inefficiency; the admissions by *syphilis* were rather lower than in 1870, and the ratio in that year was nearly one-third under the average of previous periods. The admissions from *scrofula and phthisis* were low, and only one death was caused by them, but the number of white soldiers now employed in the West Indies is so limited that considerable fluctuations may be naturally expected in the ratio from year to year.

LOCAL DISEASES.—There was a very marked increase in the admissions by *diseases of the urinary system*, the difference being chiefly in cases of gonorrhoea at Barbadoes; the admissions by it among the white troops at that station amounted to 222 per 1,000 of the strength.

There was a considerable decrease in the classes of *diseases of the respiratory system, the cellular tissue and the cutaneous system*. In the first of these it took place in bronchitis, in the second in abscesses, and in the third in cases of eczema and boils.

Poisons.—The admissions under this class were nearly twice as high as in 1870, but this has arisen from no less than 17 cases having been returned as alcoholic poisoning. Of these, 15 were returned at Barbadoes, 9 in the Royal Artillery, and 6 in the 29th Regiment. So far as can be judged these seem to have been men suffering from the effects of intemperance, and to have been erroneously returned under this class. There were 7 cases of delirium tremens admitted, being one less than in the preceding year; 5 of them occurred in the Royal Artillery at Barbadoes, and two in the detachment of the 29th Regiment at Trinidad.

INJURIES.—The admissions were considerably higher than in the preceding year, chiefly from bruises and sprains. One death from self-inflicted injury occurred in a man of the Royal Artillery at Barbadoes, who cut his throat while in hospital under treatment for delirium tremens.

2.—BLACK TROOPS.

The black troops employed in the Command during the year consisted of the head-quarters of the 2nd West India Regiment and a Corps of Military

Labourers. Their average strength was 713; the admissions into hospital *Windward* were 663, and the deaths 18, being in the ratio of 930 and 25·25 per 1,000 *and Leeward* of mean strength; the first slightly under, and the second more than double *Command*. the proportion in the preceding year.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. 14 in the Appendix; the classified results are shown in the following Table:—

Orders.	Black Troops.	1871.				1869-70.	
		Strength 713.		Ratio per 1,000.		Ratio per 1,000.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.						
1	Febrile Group	85	..	119·2	..	108·4	2·20
2	Constitutional „ ..	105	6	147·3	8·41	287·1	4·40
	II. Local Diseases.						
	Diseases of the—						
1	Nervous System	28	1	39·3	1·40	24·2	1·10
2	Eye	15	..	21·0	..	11·0	..
3	Ear	1	..	1·4	..	..	..
5	Circulatory System ..	7	2	9·8	2·81	1·1	..
6	Absorbent „	18	..	25·2	..	17·6	..
8	Respiratory „	32	3	44·9	4·21	50·6	..
9	Digestive „	68	1	95·4	1·40	69·8	2·20
10	Urinary „	135	2	189·8	2·81	110·0	..
11	Generative „	16	..	22·4	..	28·6	..
12	Organs of Locomotion ..	8	1	4·2	1·40	7·7	..
13	Cellular Tissue	20	..	28·1	..	13·2	..
14	Cutaneous System	64	..	89·8	..	91·8	..
	III. Conditions, &c.						
	Debility .. ..	..	..	..	..	1·1	..
	IV. Poisons	3	..	4·2	..	1·1	..
	V. Injuries.						
2	Accidental	63	..	88·4	..	110·0	..
4	Self Inflicted .. ..	..	2	..	2·81	..	..
	No appreciable disease ..	..	..	..	..	2·2	..
	Total	663	18	929·9	25·25	929·5	9·90
	Average of 10 years, 1861-70..	..	..	893·8	19·41	..	..

The admissions, though a little lower than in 1870, were above the average of the last ten years, and the deaths were one-fourth above it.

GENERAL DISEASES.—There was a marked reduction compared with the results for 1870 in the admissions of the febrile and constitutional groups, but an increase in the mortality by the latter.

The following table shows the admissions and deaths by the principal diseases in this class:—

Windward
and Leeward
Command.

General Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Mean Strength.			
			1871.		1869-70. *	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile Group—</i>						
Eruptive Fevers	4	..	5.6	..	..	..
Continued „	10	..	14.0	..	24.2	2.20
Paroxysmal „	49	..	68.7	..	57.2	..
Influenza	3	..	4.2	..	6.6	..
Other diseases of this group ..	19	..	26.7	..	15.4	..
<i>Constitutional Group—</i>						
Rheumatism	80	..	42.1	..	75.9	..
Syphilis	59	..	82.7	..	190.3	..
Scrofula, Phthisis, &c. ..	15	6	21.0	8.41	18.7	4.40
Anæmia	1	..	1.4	..	2.2	..

Eruptive Fevers.—Of the four cases under this head three were men whom it was found necessary to take into hospital after vaccination, and the fourth was a case of chicken pox. No cases of small-pox occurred among the troops, although the disease was very prevalent and fatal among the civil population in Trinidad.

Continued Fevers were much less prevalent than in 1870, but did not differ materially from the average of the last ten years; there was a very trifling reduction in *paroxysmal fevers*, which also closely approximated in prevalence the average of previous years. The high ratio of admissions by other diseases of the febrile group arose from mumps, of which 19 cases occurred—18 of these among the 2nd West India Regiment at Demerara.

Rheumatism was scarcely half as prevalent as in 1870; there was a slight reduction in the prevalence of *syphilis*, which still, however, gave rise to a ratio of admissions considerably above that of the white troops.

Scrofula and Phthisis continued to form an important item in the causes of mortality among the black troops; there was an increase upon the ratio of the preceding year, both in admissions and deaths, and the latter showed no decrease upon the average of the preceding years. Phthisis was the cause of upwards of one-third of the mortality among this class of troops in the Command.

LOCAL DISEASES.—There was a very great increase in the prevalence of *diseases of the urinary system*, occurring almost exclusively in gonorrhœa, the admissions by which were in the ratio of 158 per 1,000 of the strength, or upwards of one-sixth of all the admissions. There was an increase also in the admissions by *diseases of the nervous system*, chiefly neuralgia, and of *diseases of the cellular tissue*, particularly guinea worm, of which 15 cases were reported—all occurring in men who had recently been serving in Western Africa.

There was a marked decrease in *diseases of the respiratory system*, principally bronchitis; and also, though to a less extent, in those of the *generative and cutaneous systems*.

POISONS.—The admissions under this class, consisting of three cases of delirium tremens, contrast favourably with the ratio among the white troops.

INJURIES.—There were two deaths from self inflicted injuries, both in the 2nd West India Regiment. One occurred at Demerara, by hanging, when the man was confined in the police cells of Charles Town, and the other by gunshot at Barbadoes.

SANITARY REPORT.

Deputy Inspector-General Prendergast reports that the health of the *Windward* troops, on the whole, has been extremely good. The only death that occurred *and Leeward* was one of suicide. *Command.*

The condition of the several barracks in Barbadoes is very satisfactory; but some few improvements are desirable, and would tend much to the health and comfort of the troops, viz. :—

1. The erection of a married quarter for the men of the Royal Artillery.
2. Large fresh-water plunge-bath for the soldiers' brick barracks.
3. Baths for officers' brick barracks, and water-closets attached thereto.
4. Water-closets for officers' stone barracks.
5. Water supply to dead-house, Garrison Hospital.

The old and objectionable latrines at the men's stone barracks have at length been closed. New latrines (Jenning's pattern) have been erected, on a new site, for the soldiers at the stone and iron barracks, with a good supply of water, and these were duly handed over for use at the end of January 1872.

II. JAMAICA.

STATISTICAL REPORT.

1. WHITE TROOPS.

THE white troops employed in this Command consisted of a Battery of *Jamaica*. Royal Artillery and three Companies of the 29th Regiment. Their average strength for the year was 296; there were 199 admissions into hospital and four deaths among them, being in the ratio of 672 and 13·51 per 1,000 of mean strength, both higher than in 1870, but considerably under the average of the last ten years.

The following Table, framed from Abstract No. 13 in the Appendix, shows the admissions and deaths by the different classes of diseases :—

Jamaica.

Order.	Diseases.	1871.						1869-70.	
		Strength, 296.				Ratio per 1,000.		Ratio per 1,000.	
		Admissions.	Deaths.			Admitted.	Died.	Admitted.	Died.
			In Jamaica.	Of Invalids.	Total.				
	I. General Diseases.								
1	Febrile Group.. ..	34	1	..	1	114·9	3·38	124·8	8·06
2	Constitutional „ ..	24	1	..	1	81·1	3·38	61·8	2·02
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System	8	..	..	..	10·1	..	6·0	·67
2	Eye	8	..	..	..	10·1	..	7·4	..
3	Ear .. ..	..	..	..	..	..	..	1·4	..
4	Nose .. ..	..	..	..	..	..	..	·7	..
5	Circulatory System ..	5	2	..	2	16·9	6·75	11·4	·67
6	Absorbent	2	..	..	..	6·8	..	15·5	..
8	Respiratory „ ..	14	..	..	..	47·8	..	19·5	..
9	Digestive „ ..	19	..	..	..	64·2	..	66·5	..
10	Urinary „ ..	14	..	..	..	47·8	..	61·8	·67
11	Generative „ ..	3	..	..	..	10·1	..	11·4	..
12	Organs of Locomotion ..	1	..	..	..	3·4	..	9·4	..
13	Cellular Tissue	2	..	..	..	6·8	..	6·7	..
14	Cutaneous System ..	27	..	..	..	91·2	..	56·5	..
	III. Conditions, &c.								
	Debility	5	..	..	..	16·9	..	8·1	..
	IV. Poisons.	4	..	..	..	13·5	..	27·6	·67
	V. Injuries.								
2	Accidental.. ..	39	..	..	..	131·7	..	103·5	·67
	Total	199	4	..	4	672·3	15·51	599·5	18·43
	Average of 10 years 1861-70 .. ..	..	..	..	..	980·8	20·38	..	..

GENERAL DISEASES.—There was a trifling increase in the admissions by this class, confined entirely to the constitutional group, the ratio by the febrile group having been 10 per 1,000 lower than in 1870. The force in Jamaica has been so much reduced that it seems unnecessary to submit the usual detailed Table of the diseases comprised in this class.

LOCAL DISEASES.—There has been an increase in the ratio of admissions by diseases of the nervous, circulatory, respiratory, and cutaneous systems, and a decrease in those of the absorbent and urinary systems, and the organs of locomotion, but there has been no such marked prevalence of, or exemption from, any special disease as to call for detailed remarks. There was a very marked increase in the amount of ACCIDENTAL INJURIES, particularly slight contusions, but none of them terminated fatally, and there were no suicidal deaths.

2.—BLACK TROOPS.

Jamaica.

The Black Troops employed in Jamaica during the year consisted of the Head-Quarters and 5 Companies of the 1st West India Regiment. Their average strength was 543; the admissions into hospital among them amounted to 448, and the deaths to 17, being in the ratio of 825 and 31·31 per 1,000 of mean strength; the former being 149 per 1,000 higher and the latter 5·50 lower than in preceding year.

The following Table, framed from Abstract No. 14 in the Appendix, shows the admissions and deaths by the different classes of diseases:—

Order.	Black Troops. Diseases.	1871.				1869-70.	
		Strength, 543.		Ratio per 1,000.		Ratio per 1,000.	
		Admitted.	Died at Jamaica.	Admitted.	Died.	Admitted.	Died.
I. General Diseases.							
1	Febrile Group	57	1	105·0	1·84	103·4	2·15
2	Constitutional „	129	7	237·6	12·89	232·8	12·93
II. Local Diseases.							
Diseases of the—							
1	Nervous System	9	2	16·6	3·69	15·8	3·59
2	Eye	8	..	14·7	..	17·2	..
3	Ear	8	..	5·5	..	..	..
4	Nose						
5	Circulatory System	3	..	5·5	..	5·7	1·44
6	Absorbent „	8	..	14·7	..	22·3	..
8	Respiratory „	32	3	58·9	5·52	48·9	1·44
9	Digestive „	16	1	29·5	1·84	58·2	..
10	Urinary „	100	2	184·2	3·69	122·1	·72
11	Generative „	7	..	12·9	..	9·3	..
12	Organs of Locomotion ..	8	1	14·7	1·84	13·1	·72
13	Cellular Tissue	10	..	18·4	..	21·6	..
14	Cutaneous System	33	..	60·8	..	80·5	..
III. Conditions, &c.							
	Debility	2	..	3·7	..	2·9	..
IV. Poisons							
		1	..	1·8	..	..	..
V. Injuries.							
2	Accidental	21	..	38·7	..	58·9	..
4	Self-inflicted .. ..	..	..	..	..	·7	1·44
IV. Surgical Operations							
	No appreciable disease ..	1	..	1·8	..	..	..
Total		448	17	825·0	31·31	816·8	24·43
Average of 10 Years, 1861-70		..	..	1221·3	24·60	..	..

GENERAL DISEASES were more prevalent but less fatal than in 1870. The increase in the admissions was not confined to either group. In the febrile group it occurred in cases of *continued fevers*, there being a reduction in *paroxysmal*; in the constitutional group the excess was entirely in cases of

Jamaica. *syphilis*, the admissions by which amounted to no less than 189·7 per 1,000 of mean strength. There was a reduction in the admissions and deaths by *scrofula* and *phthisis*, but they still contribute largely to the mortality of this class of troops, having been the cause of upwards of one-third of all the deaths.

LOCAL DISEASES.—There was a very marked increase in the prevalence of diseases of the urinary system, chiefly gonorrhœa, and there was also a considerable increase in those of the respiratory system, while there was a decrease in those of the digestive system and of the cellular tissue. There was nothing however, connected with them which seems to require special comment.

III. BAHAMAS.

STATISTICAL REPORT.

Bahamas. The white troops consisted of 4 serjeants of the West India Regiment, among whom 4 cases and no deaths occurred.

The black troops composing the garrison consisted of two companies of the 1st West India Regiment; their average strength during the year was 145; the admissions were 147 and the deaths 6. These numbers give the annual ratio of 1,014 admissions, and 41·38 deaths per 1,000 of mean strength, the former under and the latter very much above the ratio of the preceding year, and both in excess of the average of the last ten years.

The diseases by which the sickness and mortality were caused are stated in detail in Abstract No. 14 in the Appendix, from which the following summary has been framed :—

Order.	Black Troops.	Strength, 145.		Annual Ratio per 1,000.			
				1871.		1869-70.	
	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.						
1	Febrile Group ..	11	..	75·9	..	355·1	7·68
2	Constitutional „ ..	57	4	393·1	27·60	251·4	13·43
	II. Local Diseases.						
	Diseases of the—						
1	Nervous system ..	4	..	27·6	..	13·4	..
2	Eye	2	..	13·8	..	5·8	..
3	Ear	1	..	6·9	..	..	..
5	Circulatory system ..	1	..	6·9	..	3·8	1·92
6	Absorbent „ ..	..	..	..	..	5·8	..
8	Respiratory „ ..	20	..	138·0	..	80·4	3·84
9	Digestive „ ..	13	1	89·7	6·89	65·3	1·92
10	Urinary „ ..	18	1	123·9	6·89	174·7	..
11	Generative „ ..	..	..	..	..	15·4	..
12	Organs of Locomotion ..	1	..	6·9	..	1·9	..
13	Cellular Tissue ..	..	..	..	..	11·5	..
14	Cutaneous system ..	6	..	41·4	..	55·7	..
	III. Conditions, &c.						
	Debility .. ..	..	..	..	..	5·8	..
	IV. Poisons	2	..	13·8	..	9·6	..
	V. Injuries.						
	Accidental	10	..	69·0	..	109·4	1·92
	VI. Surgical Operations ..	1	..	6·9	..	..	..
	Total	147	6	1013·8	41·38	1165·0	30·71
	Average of 10 years 1861-70	..	..	981·8	26·09	..	..

GENERAL DISEASES.—There has been a slight decrease in the prevalence of the febrile and an increase of the constitutional group. The latter has given rise to more than one-third of all the admissions into hospital and two-thirds of the deaths. The excess of the admissions has been caused by syphilis, the ratio by it having amounted to 200 per 1,000 of mean strength, or equal to one-fifth of the force; the excess of deaths arose from phthisis which, as has been repeatedly pointed out in these Reports, is a source of great mortality among the black troops in the West Indies and Western Africa. It is a point worthy of investigation whether there is any connection to be traced between this great prevalence of syphilis and the high rate of mortality from consumption.

LOCAL DISEASES.—There was an increase in diseases of the respiratory and a decrease in those of the urinary system, but the numbers under observation are too small to admit of any reliable deductions being drawn from the results of a single year.

IV. HONDURAS.

STATISTICAL REPORT.

Honduras.

There were three European non-commissioned officers, none of whom were admitted into hospital and none died. The average strength of the black troops, consisting of two companies of the 1st West India Regiment, and a few African Artillerymen, was 187, among whom 172 admissions into hospital and two deaths occurred. The former, therefore, were in the ratio of 920, and the latter of 10·70 per 1,000 of mean strength. The ratio of admissions was much lower than in 1870, and that of the deaths was nearly identical in the two years.

The admissions and deaths by the different classes of deaths are shown in the following Table, framed from Abstract No. 14 in the Appendix :—

Order.	Black Troops.	Strength, 187.		Annual Ratio per 1,000.			
	Diseases.	Admitted.	Died.	1871.		1869-70.	
				Admitted.	Died.	Admitted.	Died.
	I. General Diseases.						
1	Febrile Group.. ..	18	..	96·3	..	303·0	2·75
2	Constitutional „ ..	33	1	176·5	5·35	124·0	2·75
	II. Local Diseases.						
	Diseases of the—						
1	Nervous System	4	..	21·4	..	19·3	..
2	Eye	5	..	26·7	..	27·5	..
3	Ear .. ..	..	..	..	..	2·8	..
5	Circulatory System ..	..	1	..	5·35	8·3	2·75
6	Absorbent „	3	..	16·0	..	11·0	..
8	Respiratory „	8	..	42·8	..	30·3	2·75
9	Digestive „	22	..	117·7	..	124·0	2·75
10	Urinary „	13	..	69·5	..	101·9	..
11	Generative „	8	..	42·8	..	16·5	..
12	Organs of Locomotion ..	2	..	10·7	..	16·5	2·75
13	Cellular Tissue	4	..	21·4	..	27·5	..
14	Cutaneous System	20	..	106·9	..	68·9	..
	IV. Poisons.. ..	2	..	10·7	..	..	..
	V. Injuries.						
2	Accidental	30	..	160·4	..	124·0	2·75
	Total	172	2	919·8	10·70	1005·5	19·25
	Average of 10 Years, 1861-70	..	..	930·6	20·44	..	..

GENERAL DISEASES.—There was a very marked reduction in the prevalence of *paroxysmal fevers*; there was a moderate increase in the constitutional group, the excess being in cases of *rheumatism*.

LOCAL DISEASES.—There was an increase upon the ratios in 1870 in admissions from diseases of the *respiratory, generative and cutaneous systems*, and a decrease in those of the *digestive and urinary systems*, but none of them seem to require special comment.

INJURIES gave rise to a higher ratio of admissions than in the preceding year.

Section II.

On the Extent of Invaliding.

The numbers of invalids sent home during the year from the West Indies *West Indies & West Africa.* were 7 from the Windward and Leeward Command, and 9 from Jamaica; and the numbers finally discharged the service at Netley were 12 from the former and 4 from the latter. Of the black troops serving in the West Indies and Western Africa, 12 were discharged as invalids during the year.

The following Table shows the classes of diseases by which the invaliding was caused; the details are given in Abstracts Nos. 13 and 14 of the Appendix:—

	White Troops.				Black Troops.
	Windward and Leeward Command.	Jamaica.	Windward and Leeward Command.	Jamaica.	West Indies and Western Africa.
Mean Strength	670.	296.	670.	296.	1,908.
Classes of Disabilities ..	Invalids sent Home.	Invalids sent Home.	Discharged as Invalids at Netley.	Discharged as Invalids at Netley.	Discharged as Invalids in the Colonies
Ague .. .. .	..	1	..	..	..
Cancer .. .. .	..	..	1	..	..
Scrofula, Phthisis, &c. ..	4	1	4	2	1
Diseases of the—					
Nervous System .. ..	..	..	..	..	3
Eye	3	..	2	..	..
Ear .. .. .	..	1	..	1	..
Circulatory System ..	..	1	1	1	1
Respiratory „ .. ..	..	2	1	..	..
Digestive „ .. ..	..	2	1	..	2
Urinary „ .. ..	..	..	..	..	1
Generative „ .. ..	..	..	..	..	1
Cutaneous System ..	..	..	..	..	2
Debility .. .. .	..	1	1	..	..
Accidental Injuries ..	..	..	1	..	..
Surgical Operations ..	..	..	..	..	1
Total	7	9	12	4	12
Ratio per 1,000 of { 1871 ..	13·4	30·4	17·9	13·5	6·3
Mean Strength .. { 1861-70	31·8	27·6	17·5	17·8	17·8

Compared with the results for 1870, there was a reduction in the ratio of invalids sent home from the Windward and Leeward Command, and an increase in that from Jamaica, and in the ratio from both Commands finally discharged at Netley, but the difference was probably merely an irregularity consequent on the small numbers under observation. Phthisis was the principal disability. The proportion discharged of black troops was very low compared with previous periods. It may have been affected by the discharges consequent upon the recent reductions in the West India Regiments.

Section III.

*Mean Daily Sick.**West Indies.*

The average number of the European troops constantly non-effective from sickness during the year 1871 was 23·4 in the Windward and Leeward Command, and 9·6 in Jamaica; and of the black troops in the Windward and Leeward Command 32, in Jamaica 27·6, in the Bahamas 10·9, and in Honduras 5·9. The following Table gives the usual information calculated upon these numbers, and with the proportions for the preceding ten years as a basis for comparison.

		White Troops.		Black Troops.			
		Windward and Leeward Command.	Jamaica.	Windward and Leeward Command.	Jamaica.	Bahamas.	Honduras.
Ratio per 1,000 constantly Sick.	1871 ..	33·43	32·43	44·89	50·83	75·17	31·54
	1861-70 ..	48·67	40·63	48·10	67·14	54·88	35·25
Mean sick time to each Soldier.	1871 ..	days. 12·20	days. 11·84	days. 16·38	days. 18·55	days. 27·44	days. 11·52
	1861-70 ..	17·76	14·83	17·56	24·51	20·03	12·87
Average duration of the Cases.	1871 ..	17·61	15·17	17·16	22·49	27·06	12·52
	1861-70 ..	15·40	16·10	19·64	20·07	20·25	13·57

Compared with the results for 1870, there has been a decrease in the mean daily sick of the white troops in the Windward and Leeward Command, but a marked increase in Jamaica; the ratio in the preceding year, however, was so low in the latter Command that it was probably, as suggested in last report, an irregularity arising from reduced numbers under observation. In all except the Bahamas the proportion constantly non-effective has been considerably under the average of the last ten years. The proportion in the Bahamas was excessively high, much more so than in any of the other stations in the West Indies, a result probably of the great prevalence of syphilis and phthisis, already noticed, as these diseases usually remain for a long time under treatment. It may, perhaps, also be to some extent due to the limited numbers under observation.

Section IV.

*Influence of Age on the Mortality.**West Indies, &c.*

In consequence of the great reduction of the Force in the West Indies, and the distribution of the troops in the different Commands, it has been considered better to incorporate the returns relative to the mortality by ages into one general return, including in it, so far as they may be available, those for the troops in the Windward and Leeward Command, Jamaica, and Western Africa.

The following Return shows the numbers serving, and the deaths in each quinquennial period of life in 1870:—

Corps.	Under 20 Years.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.	
	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.
WHITE TROOPS.												
Royal Artillery	1	...	14	...	20	...	19	1	18	...	6	...
29th Regiment	203	...	313	...	203	...	45	...	18	1	...	...
Total, White Troops ...	204	...	327	...	223	...	64	1	36	1	6	...
Ratio per 1,000 of { 1871 Mean Strength { 1861-9	...	4·25	...	6·30	...	12·33	...	15·62 14·52	...	27·78 24·94	...	36·36
BLACK TROOPS.												
1st West India Regiment ...	86	3	210	5	390	8	57	2	12	...	5	1
2nd " "	170	4	246	7	244	3	147	2	20	3	5	...
Military Labourers	24	1	69	2	59	1	28	...	14	...	6	...
Total, Black Troops ...	290	8	525	14	693	12	230	4	46	3	16	1
Ratio per 1,000 of { 1871 Mean Strength { 1861-9	...	27·59 10·53	...	26·66 22·46	...	17·34 29·07	...	17·39 24·89	...	65·21 25·27	...	62·50 39·83

*West Indies,
&c.*

The most striking feature in this table is the high rate of mortality on the average of nine years at all ages up to 35 among the black as compared with the white troops. There is a decrease in the rates at 30 and under 35, due probably to the operation of the Limited Enlistment Act. The numbers are so small that accurate deductions cannot be drawn from the experience of a single year.

VI.—ON THE HEALTH OF THE TROOPS SERVING IN WESTERN AFRICA.

Section I.

Sickness and Mortality.

STATISTICAL REPORT.

THE white troops employed in Western Africa consisted of four European non-commissioned officers of the 2nd West India Regiment, among whom five cases and one death occurred during the year, the latter by delirium tremens.

The black troops consisted of four companies of the 2nd West India Regiment, two of which were stationed at Sierra Leone and two on the Gold Coast at Accra and Cape Coast Castle. The average strength of this class of troops was 320; the admissions into hospital among them amounted to 625, and the deaths to 5, being respectively in the ratio of 1,953 and 15·63 per 1,000 of mean strength, the former nearly double and the latter one-fourth under the ratio in the preceding year.

The following Table framed from Abstract No. 14 in the Appendix, shows the admissions and deaths by each class of diseases:—

*Western
Africa.*

Western
Africa.

Order.	Diseases.	1871.				1869-70.	
		Mean Strength, 320.		Ratio per 1,000.		Ratio per 1,000.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. General Diseases.							
1	Febrile Group	285	..	890·6	..	166·2	·95
2	Constitutional „	76	2	237·5	6·25	274·5	6·64
II. Local Diseases.							
Diseases of the—							
1	Nervous System	3	1	9·4	3·13	11·3	1·90
2	Eye	13	..	40·6	..	19·9	..
3	Ear	4	..	12·5	..	·9	..
5	Circulatory System ..	4	..	12·5	..	3·8	·95
6	Absorbent	6	..	18·8	..	15·2	..
8	Respiratory „	25	..	78·1	..	48·4	3·80
9	Digestive „	53	2	165·6	6·25	113·0	3·80
10	Urinary „	46	..	143·8	..	186·8	1·90
11	Generative „	15	..	46·9	..	15·2	..
12	Organs of Locomotion ..	1	..	3·1	..	15·2	·95
13	Cellular Tissue	16	..	50·0	..	53·2	1·90
14	Cutaneous System	33	..	103·1	..	113·0	..
III. Conditions, &c.							
	Debility	1	..	3·1	..	2·8	..
IV. Poisons.							
		..	..	..	..	·9	..
V. Injuries.							
2	Accidental	44	..	137·5	..	88·3	1·90
	Diseases not stated ..	..	..	..	..	4·7	..
	Total	625	5	1953·1	15·63	1083·3	24·69
	Average of 10 years 1861-70*	..	..	1283·1	22·49	..	..

The ratio of admissions has been one-half higher, and that of the deaths one-third lower than the average of the last ten years.

GENERAL DISEASES gave rise to considerably above half of the admissions and to two-fifths of the deaths; the febrile group furnished nearly four-fifths of the cases but no deaths. The great majority of the admissions were by ague and remittent fevers, which were more than thrice as prevalent as in the preceding year. The two deaths were caused by consumption.

Rheumatism was more than twice as prevalent as in 1870, but there was a very marked reduction in the admissions by *syphilis*.

LOCAL DISEASES.—There was no special prevalence of any disease requiring comment. There was a considerable reduction in the amount of gonorrhœa, but a corresponding increase in cases of orchitis. There was an increase in the cases of abscess and also in boils and ulcers.

INJURIES.—There was an increase in the admissions by accidental injuries, but none of them proved fatal; and there were no cases of self-inflicted injury.

* This average includes only Sierra Leone and the Gold Coast.

*Section II.**On the Extent of Invaliding.*

The extent of invaliding has been included under this section in the Report on the West Indies.

*Western
Africa.*

*Section III.**Mean Daily Sick.*

The average number of men constantly non-effective from sickness during the year was 24·4 or in the ratio of 76·25 per 1,000 of mean strength, being very much in excess of the proportion in 1870. The usual calculations, based on these numbers, show the average sick time to each soldier to have been 27·83 days, and the average duration of the cases 14·28 days, the former being much higher and the latter a fraction lower than the average of previous periods.

*Section IV.**Influence of Age on the Mortality.*

The influence of age on the mortality has been included under this section in the Report on the West Indies.

VII.—ON THE HEALTH OF THE TROOPS SERVING AT THE CAPE OF GOOD HOPE AND ST. HELENA.

*Section I.**Sickness and Mortality.*

STATISTICAL REPORT.

On the 1st January, four companies of the 2nd Battalion 20th Regiment landed from Mauritius at the Cape, and continued to serve there till 5th December, when they left for England. In the middle of October, the 75th Regiment arrived from Hong Kong and Singapore, and replaced the wing of the 20th Regiment and the Head-Quarters and four companies of the 32nd Regiment, which embarked for Mauritius. The troops employed at St. Helena during the year consisted of a battery of Royal Artillery and a company of Royal Engineers.

*Cape of Good
Hope and
St. Helena.*

The average strength of the troops at the Cape and St. Helena during the year was 2,473; the admissions into hospital were 2,451, and the deaths

Cape of Good Hope and St. Helena. were 26, including five among invalids on their passage home and at Netley. These numbers give the ratio of 991 admissions and 10·51 deaths per 1,000 of mean strength, both considerably lower than in the preceding year, but closely corresponding with the average of the last ten years.

The following Table, framed from Abstract No. 15 in the Appendix, shows the influence of the different classes of diseases in causing the sickness and mortality in this Command :—

Order.	Diseases.	1871.						1869-70.	
		Mean Strength, 2,473.						Annual Ratio per 1,000 of Strength.	
		Admitted.	Deaths.			Ratio per 1,000		Admitted.	Died.
			In Command.	Of Invalids.	Total.	Admitted.	Died.		
I. General Diseases.									
1	Febrile Group	269	2	..	2	108·8	·81	108·0	·81
2	Constitutional „ ..	450	8	3	6	182·0	2·48	219·7	3·52
II. Local Diseases.									
Diseases of the—									
1	Nervous system	25	3	1	4	10·1	1·62	13·1	1·35
2	Eye	81	..	..	..	32·8	..	47·5	..
3	Ear	7	..	..	..	2·8	..	3·6	..
4	Nose	6	..	..	..	2·4	..	..	..
5	Circulatory system ..	21	4	..	4	8·5	1·62	11·1	1·22
6	Absorbent „ ..	42	..	..	..	17·0	..	15·0	..
8	Respiratory „ ..	58	2	..	2	23·4	·81	43·2	·55
9	Digestive „ ..	369	2	1	3	149·2	1·21	139·7	2·44
10	Urinary „ ..	479	..	..	..	193·7	..	226·0	·18
11	Generative „ ..	47	..	..	..	19·0	..	16·5	..
12	Organs of Locomotion ..	21	1	..	1	8·5	·40	5·3	·18
13	Cellular Tissue ..	46	..	..	..	18·6	..	26·5	..
14	Cutaneous system ..	216	..	..	..	87·3	..	95·7	..
III. Conditions, &c.									
	Debility	17	1	..	1	6·9	·40	9·5	·18
IV. Poisons									
	.. ..	14	2	..	2	5·7	·81	12·3	·55
V. Injuries.									
2	Accidental	278	1	..	1	112·4	·40	141·2	1·35
3	Homicidal .. ..	..	..	..	..	..	..	..	·13
4	Self-inflicted .. ..	..	..	..	..	..	..	·5	·27
VI. Surgical Operations									
	.. ..	1	..	..	..	·4	..	·7	..
	No appreciable disease ..	4	..	..	..	1·6	..	1·2	..
	Total	2,451	21	5	26	991·1	10·51	1181·2	12·58
	Average of 10 years, 1861-70 .. ..	} ..	..	..	..	995·5	10·77	..	..

GENERAL DISEASES.—There has been a decrease in the admissions compared with the preceding year, confined however to the constitutional group, the febrile group showing a slight increase. The following Table shows the admissions and deaths by each of the principal diseases in this class :—

*Cape of Good
Hope and
St. Helena.*

General Diseases.	Admitted	Died.	Annual Ratio per 1,000 of Strength.			
			1871.		1869-70.	
			Admitted	Died.	Admitted	Died.
<i>Febrile—</i>						
Eruptive Fevers	8	..	3·2	..	1·0	..
Continued „	78	2	31·6	·81	59·2	·41
Paroxysmal „	83	..	33·6	..	31·5	·27
Influenza	88	..	35·6	..	8·0	..
Erysipelas	4	..	1·6	..	2·8	·13
Other Diseases of this group ..	8	..	3·2	..	·5	..
<i>Constitutional—</i>						
Rheumatism	81	..	32·8	..	44·5	·14
Syphilis	352	1	142·3	·40	162·3	·27
Scrofula, Phthisis, &c. ..	12	5	4·9	2·03	11·4	3·11
Anæmia	2	..	·8	..	·7	..
Other Diseases of this group ..	3	..	1·2	..	·8	..

Eruptive Fevers were more prevalent than in 1870, from the occurrence of an epidemic of measles at Cape Town in September; seven cases occurred among the men of the 86th Regiment quartered there, and there were 45 cases, of which two were fatal, among 163 children of that corps.

Continued and Paroxysmal Fevers were less prevalent than in the preceding year, but this was more than counterbalanced by an increase in the admissions from influenza. This disease was confined entirely to the 86th Regiment at Cape Town, and became prevalent in the beginning of August; it was attributed by the Medical Officer to the sudden transitions of temperature to which Cape Town is liable at that time. It does not, however, appear to have affected officers, women, or children. *Rheumatism* and *syphilis* were both considerably less prevalent than in 1870, and there was also a marked decrease in the admissions and deaths by *scrofula*, *phthisis*, &c.

LOCAL DISEASES.—There was a considerable decrease in *diseases of the eye*, in those of the *respiratory system*, particularly bronchitis, and in those of the *urinary system*. Gonorrhœa however still continued very prevalent, the admissions by it having amounted to 182 per 1,000 of the strength; the 86th Regiment at Cape Town furnished an undue proportion of these cases, the ratio in it having been as high as 280 per 1,000. There was a marked increase in *diseases of the digestive system*, especially dysentery, diarrhœa, and dyspepsia, but this was to some extent counterbalanced by a great decrease in the cases of hepatitis. The 20th Regiment furnished the greatest number of cases of dyspepsia, the 86th of dysentery, and the 75th of diarrhœa.

POISONS.—There was a marked decrease in the admissions by delirium tremens; two deaths occurred by this class of diseases, one in the Royal Artillery by delirium tremens, and the other in the 86th Regiment, the result of drinking a pint of spirit at one draught.

SANITARY REPORT.

Deputy-Inspector General Grant reports:—

The health of the troops does not appear to have been injuriously affected by any special causes. The prominent sanitary defects are the same as those stated last year.

The objections stated to the hospital at Cape Town continue.

A recommendation was made last year that a new hospital should be erected at Fort Napier, Natal, which was very strongly supported by the Lieutenant-General Commanding, who urged the necessity of the measure, and it is understood that estimates for a new building have been sent in by the Commanding Royal Engineer.

*Cape of Good
Hope and
St. Helena.*

Section II.

On the Extent of Invaliding.

During the year there were 44 invalids sent home from the Command, being in the ratio of 17·8 per 1,000 of mean strength ; 31, or 12·5 per 1,000, were finally discharged the service at Netley, and one at the Cape.

The disabilities for which the men were invalided are detailed in Abstract No. 16 in the Appendix, from which the following classified summary has been framed :—

Disabilities.	Invalids sent to England from Cape and St. Helena.	Invalids Discharged the Service.	
		At the Cape.	At Netley.
Syphilis	2	..	..
Scrofula, Phthisis, &c.	5	..	13
Diseases of the—			
Nervous System	4	..	2
Eye	6	..	1
Nose	1	..	..
Circulatory System	3	1	5
Absorbent "	1	..	..
Digestive "	10	..	4
Locomotive "	5	..	2
General Debility	4	..	..
Poisons	1	..	..
Accidental Injuries	1	..	8
Surgical operations	1	..	1
Total	44	1	31
Ratio per 1,000 of Mean Strength { 1871	17·8	·4	12·5
{ 1861-70	29·7	1·6	20·6

The proportion of men sent home as invalids was only half, and the proportion finally discharged two-thirds of that of the preceding year. Diseases of the digestive system furnished the largest number of invalids, but it seems probable that these were in many instances a result of previous service in China. Phthisis was the disease which caused the greatest number of final discharges.

Section III.

Mean Daily Sick.

The average number constantly non-effective from sickness in the Command was 108, or in the ratio of 43·69 per 1,000 of mean strength—about 2½ per 1,000 lower than in the preceding year. The following Table gives the usual information calculated upon these numbers :—

	1871.	1861-70.
Ratio per 1,000 of Strength constantly Sick.. .. .	43·69	50·61
Average Sick time to each Soldier	days. 15·94	days. 18·47
Average duration of cases of Sickness	16·08	18·55

Compared with the preceding year there has been, as above noted, a *Cape of Good Hope and St. Helena.* decrease in the mean daily sick, but this has been attended by a slight increase in the duration of the cases, which is still, however, $2\frac{1}{2}$ days under the average of the last ten years.

Section IV.

Influence of Age on the Mortality.

In consequence of the changes of regiments at the Cape, the returns for the Ordnance and the 86th Regiment only are available. The following Table gives the information respecting these corps :—

	Under 20.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.	
	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.
Royal Artillery	9	...	60	...	55	1	43	1	32	...	5	...
Royal Engineers	2	...	27	1	50	...	17	...	8	...	...	...
86th Foot	197	...	241	2	123	2	125	2	92	4	51	...
Total	208	...	328	3	228	3	185	3	132	4	56	...
Ratio per 1,000 of { 1871 ... ..	...	...	9·14	...	13·15	...	16·21	...	30·30	...	...	...
Mean Strength ... { 1861-70	1·55	...	6·63	...	11·20	...	16·62	...	19·22	...	56·64	...

The results for the year do not differ materially from the average of the preceding ten years, not more than might reasonably be expected when the numbers under observation are so limited.

VIII.—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF MAURITIUS.

Section I.

Sickness and Mortality.

STATISTICAL REPORT.

In the middle of November, a wing of the 32nd, from the Cape, relieved the wing of the 2nd Battalion 20th Regiment, which embarked for England. In addition to these corps the garrison consisted during the year of a battery of Royal Artillery and a company of Royal Engineers. The average strength of the troops was 475; the admissions into hospital were 475, and the deaths were 7. These numbers give the ratio of 1,000 admissions and 14·75 deaths per 1,000 of mean strength, both lower than in the preceding year. *Mauritius.*

The following Table, framed from Abstract No. 15 in the Appendix, shows the admissions and deaths by the different classes of diseases :—

Mauritius.

Order.	Diseases.	Strength 475.				1871.		1869-70	
		Admitted.	Died.			Ratio per 1,000.		Ratio per 1,000.	
			At Mauritius.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile Group ..	210	1	..	1	442·1	2·11	817·4	4·78
2	Constitutional „ ..	51	..	..	..	107·4	..	126·8	3·98
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	3	1	..	1	6·3	2·11	8·8	·80
2	Eye	3	..	..	..	6·3	..	17·5	..
3	Ear	2	..	..	..	4·2	..	4·8	..
5	Circulatory System ..	5	1	..	1	10·5	2·11	8·8	1·59
6	Absorbent „ ..	5	..	..	..	10·5	..	11·2	..
8	Respiratory „ ..	9	..	..	..	19·0	..	50·2	·80
9	Digestive „ ..	82	3	..	3	172·6	6·31	220·1	·80
10	Urinary „ ..	28	..	..	..	59·0	..	79·7	..
11	Generative „ ..	7	..	..	..	14·8	..	12·8	..
12	Organs of Locomotion ..	2	..	..	..	4·2	..	4·0	..
13	Cellular Tissue ..	6	..	..	..	12·6	..	18·3	..
14	Cutaneous System ..	23	..	..	..	48·4	..	71·8	..
	III. Conditions, &c.								
	Debility	4	..	..	..	8·4	..	2·4	..
	IV. Poisons ..	2	1	..	1	4·2	2·11	30·3	2·39
	V. Injuries.								
2	Accidental	32	..	..	..	67·4	..	81·3	..
	VI. Surgical Operations	1	..	..	..	2·1	..	..	..
	Total	475	7	..	7	1000·0	14·75	1566·2	15·14
	Average of 10 years, 1861-70 .. ..	} ..	..	..	..	1056·5	20·17	..	..

Compared with the results for 1870, there has been a decrease of 132 per 1,000 in the admissions, and 1·79 per 1,000 in the deaths.

GENERAL DISEASES.—There has been a slight increase in the admissions by the febrile, and a decrease in the constitutional group, and a decrease in the deaths by both groups. The following Table shows the influence of the principal diseases of this class in the sickness and mortality:—

General Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted	Died.	Admitted	Died.
<i>Febrile—</i>						
Continued Fevers	29	..	61.1	..	30.2	..
Paroxysmal „	173	1	364.2	2.11	779.9	3.98
Influenza. „	8	..	16.8	..	4.8	..
Erysipelas .. ..	..	..	..	..	1.6	.80
Other Diseases of this Group ..	..	..	..	..	.8	..
<i>Constitutional—</i>						
Rheumatism	19	..	40.0	..	34.8	..
Syphilis	25	..	52.6	..	63.8	..
Scrofula, Phthisis, &c. ..	3	..	6.3	..	13.6	3.98
Anæmia	4	..	8.4	..	15.1	..

There has been an increase in the amount of *continued*, and a decrease in *paroxysmal fevers*, the general result being a slight decrease compared with the amount in 1870; they were however little more than one-third as prevalent as in 1869. There was a slight increase in the prevalence of *rheumatism* and decrease in *syphilis* compared with the preceding year. Only three cases of *phthisis* were admitted and none died.

LOCAL DISEASES.—There was a decrease compared with 1870 in the prevalence of *diseases of the eye* and of the *respiratory* and *cutaneous systems*; in the other classes the results did not differ very materially in the two years.

POISONS.—There was a considerable reduction in the admissions by this class, but it arose from a number of cases of intemperance having been included in 1870 under the head of alcoholic poisoning.

SURGICAL OPERATIONS.—The case under this head was that of an artilleryman who was wounded by the bursting of a shell which he was examining; the injuries inflicted rendered necessary the amputation of the left forearm and of the right thumb and index finger.

SANITARY REPORT.

Surgeon-Major Small, the Senior Medical Officer, reports :—

“The health of the troops during 1871, when compared with the years immediately preceding, has been very satisfactory, and is, I think, entirely due to the few night duties now required of the men, and to the continued prophylactic use of quinine by all.”

The sanitary reports from the Medical Officers in Port Louis and Mahébourg, the only two stations on the seaboard in occupation during the past year, do not contain any new nor serious complaints regarding the health condition of the troops due to defects in barrack buildings, &c. Though all bring prominently forward the great need which exists for the removal of the troops from nearly all these objectionable stations on the sea-shore and for their transfer to the higher lands, as at Curejogie, where they would have the benefit of a climate nearly European, and complete immunity from the effects of malaria.

As regards the sanitary improvements in Port Louis, in continuation of the notice given in last year's Report, Surgeon-Major Small reports that it is satisfactory to note that the principal sanitary works therein referred to have made great progress during 1871, and that they are still being pushed forward vigorously under the supervision of the Permanent Works Committee of the General Board of Health; while, on its side, the Local Board of Health has been occupied with some smaller portions of the operations.

*Section II.**On the Extent of Invaliding.**Mauritius.*

Six invalids were sent from Mauritius to England during the year, and one was finally discharged the service at Netley, being respectively in the ratio of 12·6 and 2·1 per 1,000 of mean strength, and both greatly under the average of the preceding ten years, when the ratios were 41·53 and 17·29 respectively. The disabilities were aneurism one, hepatitis one, ulcer one, debility two, and amputation one. The last was the man who was finally discharged the service at Netley.

*Section III.**Mean Daily Sick.*

The average daily sick during the year was 20, or in the ratio of 42·10 per 1,000 of mean strength, being three per 1,000 higher than in the preceding year. The following Table gives the usual information on this head.

					1871.	1881-70.
Ratio per 1,000 of Strength constantly Sick	..	..	..	..	42·10	45·13
Mean Sick-Time to each Soldier	..	..	..	..	Days. 15·37	Days. 16·47
Average duration of cases of Disease	..	..	..	..	15·87	15·59

Although there has been an increase in all these particulars compared with the results for 1870, they are all under the average of the last 10 years, and have not differed materially from the ratios of infantry serving in the United Kingdom, except in the duration of the cases, which has been 3½ days less in the Mauritius than at home.

*Section IV.**Influence of Age on the Mortality.*

In consequence of the change of regiments the age returns of the Artillery and Engineers are alone available, and the numbers under observation are so small as to prevent any deductions being drawn from them.

**IX.—ON THE HEALTH OF THE TROOPS SERVING IN THE
ISLANDS OF CEYLON AND LABUAN.**

Section I.

Sickness and Mortality.

I.—CEYLON.

STATISTICAL REPORT.

1.—WHITE TROOPS.

The garrison during the year consisted of two Battalions of Royal Artillery and the 73rd Regiment. The average strength was 974, the admissions into hospital were 1,133, and the deaths were 12, including those of invalids on their passage home and at Netley. These numbers give the ratio of 1,163 admissions and 12·32 deaths per 1,000 of mean strength, both considerably lower than in the preceding year. *Ceylon.*

The following Table, framed from Abstract No. 15 in the Appendix, shows the admissions and deaths by the different classes of diseases :—

Ceylon.

Orders.	White Troops ..	Strength, 974.				Annual Ratio per 1,000.			
	Diseases.	Admitted.	Died.			1871.		1869-70.	
			At Ceylon.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile Group ..	210	5	..	5	215·6	5·13	228·5	1·66
2	Constitutional „ ..	151	..	1	1	155·0	1·03	147·3	4·97
	II. Local Diseases.								
	Diseases of the—								
1	Nervous system ..	16	..	..	..	16·4	..	8·3	1·10
2	Eye	27	..	..	..	27·7	..	48·6	..
3	Ear	10	..	..	..	10·3	..	18·2	..
5	Circulatory system ..	15	..	..	..	15·4	..	17·7	3·31
6	Absorbent „ ..	34	..	..	..	34·9	..	34·2	..
8	Respiratory „ ..	24	..	..	..	24·7	..	57·9	1·10
9	Digestive „ ..	251	2	2	4	257·5	4·10	380·8	9·38
10	Urinary „ ..	81	1	..	1	83·2	1·03	83·3	1·10
11	Generative „ ..	17	..	..	..	17·5	..	29·8	..
12	Organs of Locomotion	7	..	..	..	7·2	..	7·7	..
13	Cellular Tissue ..	29	..	..	..	29·8	..	38·6	..
14	Cutaneous system ..	96	..	..	..	98·6	..	160·6	·55
	III. Conditions, &c.								
	Debility	14	..	..	..	14·4	..	3·3	..
	IV. Poisons ..	5	..	..	..	5·1	..	33·1	1·10
	V. Injuries.								
2	Accidental	146	1	..	1	149·9	1·03	136·9	1·10
4	Self-inflicted „ ..	..	..	..	..	..	..	..	·55
	No appreciable disease	..	..	..	..	..	..	3·3	..
	Total	1,133	9	3	12	1163·2	12·32	1438·1	25·92
	Average of 10 years, 1861-70 .. ..	} ..	..	..	..	1395·2	24·00	..	..

The admissions have been one-sixth under, and the deaths little more than half the average of the preceding ten years.

GENERAL DISEASES were more prevalent and fatal than in 1870, the excess occurring in the febrile group alone. The admissions and deaths by each of the principal diseases in this class were as follows:—

General Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted	Died.	Admitted	Died.
<i>Febrile—</i>						
Eruptive Fevers.. ..	2	..	2·1	..	..	..
Continued „	83	..	85·2	..	50·8	1·10
Paroxysmal „	119	4	122·2	4·10	170·0	·55
Malignant Cholera	1	1	1·0	1·08	..	..
Influenza..	5	..	5·1	..	7·7	..
<i>Constitutional—</i>						
Rheumatism	29	..	29·8	..	23·7	..
Syphilis	99	..	101·6	..	87·2	..
Scrofula, Phthisis, &c. ..	6	..	6·2	1·08	17·7	4·41
Scurvy and Purpura .. ..	..	..	..	..	·5	..
Anæmia	16	..	16·4	..	14·3	..
Other Diseases of this group ..	1	..	1·0	..	3·7	·56

Eruptive Fevers caused only two admissions, one of small-pox in the Royal Artillery, and one of cow-pox in the 73rd Regiment. Although small-pox prevailed as an epidemic in the native town of Colombo for many months, only one modified case occurred among the white troops.

Continued Fevers were considerably more prevalent than in 1870. They occurred chiefly in the 73rd Regiment at Colombo, 73 of the cases having occurred in it there. None of the cases proved fatal.

Paroxysmal Fevers were very little more prevalent than in the preceding year, but were of a more severe type, giving rise to four deaths, all by remittent fever and in the 73rd Regiment. This form of fever broke out in the Regiment about the 20th September, 19 cases and three deaths occurred before the end of the month, and two cases with one death in the beginning of October; all the cases came from one barrack, situated close to the canal. The disease was attributed to the insanitary condition of the canal, in which the water was very low at that time and the municipal authorities had commenced operations to deepen it, the mud being thrown up on its banks and left exposed to the high temperature. When remittent fever became thus prevalent the troops were removed from the barracks and placed under canvas, and the disease ceased. The troops did not return to their barracks till the canal was well filled with water, and there was then no recurrence of the disease.

The prevalence of the constitutional group of general diseases differed very slightly from the preceding year.

LOCAL DISEASES.—There was an increase, but to no great extent, in the admissions by *diseases of the nervous and locomotive systems* and by general debility and accidental injuries, and a decrease in all the other classes, most marked in the *diseases of the digestive system*, and also considerable in those of the *respiratory and cutaneous systems*. There was a marked decrease in the deaths by *diseases of the digestive system*.

2. ASIATIC TROOPS.

The Asiatic troops employed in the Island consisted of Gun Lascars and 8 companies of the Ceylon Rifle Regiment. Their average strength was 848, the admissions into hospital were 532 and the deaths were 7. These numbers give the ratio of 627 admissions and 8·25 deaths per 1,000 of mean strength, both lower than in the preceding year and considerably under the average of the last ten years.

H

Ceylon.

The following Table, framed from Abstract No. 15 in the Appendix, shows the admissions and deaths by each of the different classes of diseases.

Orders.	Asiatic Troops ..	Strength 848.		Annual Ratio per 1,000 of Mean Strength.			
		Admitted	Died.	1871.		1869-70.	
	Diseases.			Admitted	Died.	Admitted.	Died.
	I. General Diseases.						
1	Febrile Group ..	168	1	198.1	1.17	187.8	1.68
2	Constitutional „ ..	89	2	46.0	2.36	69.3	1.68
	II. Local Diseases.						
	Diseases of the—						
1	Nervous System . ..	5	..	5.9	..	3.3	1.68
2	Eye	37	..	43.6	..	44.7	..
3	Ear .. ..	..	..	..	..	..	..
5	Circulatory System ..	1	..	1.2	..	3.3	.56
6	Absorbent „ ..	9	..	10.6	..	7.3	..
8	Respiratory „ ..	37	2	43.6	2.36	54.2	3.35
9	Digestive „ ..	47	2	55.4	2.36	45.9	.56
10	Urinary „ ..	18	..	21.2	..	27.4	..
11	Generative „ ..	11	..	13.0	..	18.2	..
12	Organs of Locomotion	2	..	2.4	..	1.1	..
13	Cellular Tissue ..	13	..	21.2	..	22.9	..
14	Cutaneous System ..	86	..	101.4	..	105.7	.88
	III. Conditions &c.						
	Debility	6	..	7.1	..	2.3	..
	IV. Poisons.	..	..	..	..	.6	..
	V. Injuries.						
2	Accidental	48	..	56.6	..	42.5	..
	Total	532	7	627.3	8.25	685.0	10.07
	Average of 10 years, } 1861-70 .. ..	..	..	972.7	14.98	..	..

GENERAL DIAGNOSIS.—The admissions by both groups of this class were much lower than in 1870, but without any corresponding reduction in the deaths. The influence of the principal diseases of this class in causing sickness and mortality was as follows:—

Ceylon.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers	10	..	11·8	..	6·2	..
Continued „	2	..	2·3	..	·5	..
Paroxysmal „	154	..	181·6	..	173·9	1·12
Malignant Cholera .. ..	..	..	..	..	..	·55
Erysipelas	1	1	1·2	1·17	·5	..
Other diseases of this group.	1	..	1·2	..	1·7	..
<i>Constitutional—</i>						
Rheumatism	14	..	16·5	..	37·4	·55
Syphilis	9	..	10·6	..	15·6	..
Scrofula, Phthisis, &c. ..	..	2	..	2·36	3·4	1·12
Anæmia .. ..	..	..	..	..	2·4	..
Other diseases of this group.	16	..	18·9	..	9·5	..

Eruptive Fevers were much more prevalent than in the preceding year. The excess was due to the occurrence of six cases of chicken-pox in the detachment of the Ceylon Rifles at Kandy. Only three cases of small-pox occurred at Colombo during the year, although, as already stated, that disease raged as an epidemic among the civil population. There was a great reduction in the amount of *paroxysmal fevers* compared with 1870, but they still caused between one-third and one-fourth of all the admissions into hospital. There was a very marked decrease in cases of *rheumatism*, and a trifling reduction in *syphilis* which has never been a source of much inefficiency among the Asiatic troops in this island. Of the 16 admissions grouped under other constitutional diseases 15 were men affected with beri-beri contracted in Labuan. None of them died, but four were ultimately discharged the service on account of it.

LOCAL DISEASES.—There was a considerable decrease in the prevalence of diseases of the *respiratory* and *cutaneous systems*, and a moderate decrease in those of the *generative system* and of the *cellular tissue*, while there was a moderate increase in diseases of the *eye* and of the *digestive system*.

SANITARY REPORT.

This station having been fully reported upon in previous years, and no changes of importance being notified in the Principal Medical Officer's Report for 1871, it has not been deemed necessary to publish any additional remarks in the present volume.

II.—LABUAN.

STATISTICAL REPORT.

In the beginning of the year the garrison consisted of two companies of the Ceylon Rifle Regiment. On the 9th March, one company embarked for Ceylon. In June and July two batches of invalids were sent to Ceylon, and in the middle of September the remainder of the detachment was withdrawn, being replaced by a native police force. The average strength of the garrison during the eight months and a half was 92 men, representing a mean *annual* strength of 66; the admissions into hospital were 133; the deaths in hospital were 11, and of invalids on their passage to Ceylon 2, making a total of 20. These numbers give the ratio of 2,015 admissions and 303·03 deaths per 1,000 of mean annual strength, both in excess of the very high ratios of the

Labuan.

Labuan. preceding year. During the same period 38 men were invalided to Ceylon on account of disease, being in the ratio of 576 per 1,000 of mean annual strength. Eleven of these died on the passage and are included in the deaths; deducting these there was a loss by death and invaliding during the year of 47 men, being in the annual ratio of 712·1 per 1,000 of mean strength or upwards of two-thirds of the force.

The following Table, framed from Abstract No. 15 in the Appendix, shows the influence of the different classes of diseases in causing this sickness and mortality.

Average Annual Strength .. 66		1871.					
Orders.	Classes of Diseases.	Admitted.	Died.		Total Deaths.	Ratio per 1,000.	
			In the Island.	Of Invalids.		Admitted.	Died.
	I. General Diseases						
1	Febrile Group	51	..	..	..	772·7	..
2	Constitutional Group ..	71	11	9	20	1075·8	303·03
	II. Local Diseases.						
	Diseases of the—						
2	Eye	2	..	..	..	30·3	..
8	Respiratory System ..	2	..	..	..	30·3	..
9	Digestive	2	..	..	..	30·3	..
13	Cellular Tissue	2	..	..	..	30·3	..
14	Outaneous System ..	1	..	..	..	15·2	..
	V. Injuries.						
2	Accidental	2	..	..	..	30·3	..
	Total	133	11	9	20	2015·2	303·03

GENERAL DISEASES.—The 51 admissions by the febrile group were all cases of ague; of the 71 by the constitutional group, 70 were cases of beri-beri and one of acute rheumatism. All the deaths, both in the Island and on the passage to Ceylon, were caused by beri-beri.

Invaliding.—As already stated, 38 invalids were sent from Labuan to Ceylon during the year, being in the annual ratio of 576 per 1,000 of mean strength. Of these 11 died on the passage, and 15, or 227 per 1,000 of mean strength, were finally discharged the service in Ceylon. Six of the men were invalided for ague and 32 for beri-beri. Of those finally discharged four were cases of beri-beri, two of ulcers, and nine were returned under the head of general debility.

Assistant-Surgeon White, who was in charge of the detachment, expresses very decidedly his opinion founded upon a careful observation and study of the cases, that beri-beri was caused in the island by marsh miasm, concurring in this view with Dr. Barry, whose paper was published in the last volume of these Reports.

Section II.

On the Extent of Invaliding.

Ceylon. During the year there were 61 invalids of the European troops sent to England, and 30 finally discharged the service at Netley, being respectively in the ratio of 62·6 and 30·8 per 1,000 of mean strength, both considerably higher

than in 1870. Of the Asiatic troops 51 were finally discharged the service, exclusive of 15 sent as invalids from Labuan, being in the annual ratio of 60·1 per 1,000 of mean strength, and nearly 5 per 1,000 higher than in the preceding year.

The following Table, framed from Abstract No. 16 in the Appendix, shows the classes of diseases by which the invaliding was caused :—

	European Troops.		Asiatic Troops.
	Invalids sent to England.	Invalids Discharged at Netley.	Discharged as Invalids in Ceylon.
Remittent Fever	1	..	..
Rheumatism	2	..	8
Syphilis	1	2	1
Scrofula and Phthisis	4	4	..
Anæmia	1	2	..
Diseases of the—			
Nervous System	6	1	1
Eye	3	1	7
Ear	1	..	..
Circulatory System	8	4	..
Respiratory "	2	1	2
Digestive "	19	7	..
Urinary "	1	2	..
Generative "	1	2	..
Organs of Locomotion	2	3	..
Cutaneous System .. ..	..	..	2
Debility	7	..	30
Accidental Injuries	2	1	..
Total	61	30	51
Ratio per 1,000 of Mean { 1871 ..	62·6	30·8	60·1
Strength { 1861-70	52·1	23·6	20·4

Diseases of the digestive system continue to hold the first place among the causes of invaliding among the European troops. The proportion invalidated for diseases of the circulatory system is high ; five of the cases were sent home for valve disease of the heart.

The proportion discharged of the Asiatic troops was unusually high, but this may have arisen partly from a reduction of two companies of the Ceylon Rifle Regiment having taken place during the year, when, probably, some of the most inefficient men would be discharged as invalids. This view seems borne out by the large number of men discharged under the head of general debility, all of whom were men of 40 years of age and upwards, and having above 20 years of service.

Section III.

Mean Daily Sick.

The average number constantly non-effective from sickness in 1871 in Ceylon was 53 in the European and 29 in the Asiatic force, being respectively in the ratio of 54·41 and 34·20 per 1,000 of mean strength, both under the proportion in the preceding year.

The following Table gives the usual information on this subject :—

Ceylon.

	European Troops.		Asiatic Troops.	
	1871.	1861-70.	1871.	1861-70.
Ratio per 1,000 of Strength constantly sick	54.41	54.80	54.20	53.23
Average sick time to each Soldier ..	days. 19.86	days. 23.65	days. 12.48	days. 12.13
Average duration of cases of Sickness ..	17.07	16.95	19.90	12.47

There has been a decrease in the mean daily sick of both classes of troops compared with the results for 1870. There has been also a decrease in the sick time to each soldier, but there has been a very slight increase in the average duration of the cases in the European, and an increase of about two and a-half days in the Asiatic force.

Section IV.

On the Influence of Age on the Mortality.

The following Table shows the ages of the European troops, and the deaths at each age in quinquennial periods. The return of the Ceylon Rifles is not available as the two companies serving at Labuan are included :—

Warrior Troops.		Under 20 Years.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.	
Corps.		Strength on 1st Jan.		Strength on 1st Jan.		Strength on 1st Jan.		Strength on 1st Jan.		Strength on 1st Jan.		Strength on 1st Jan.	
		Strength	Died.	Strength	Died.	Strength	Died.	Strength	Died.	Strength	Died.	Strength	Died.
Royal Artillery ...	...	8	...	30	...	49	...	45	...	33	1	2	...
73rd Foot...	...	131	...	274	4	179	3	60	2	10	2	...	...
Total ...	...	139	...	304	4	228	3	105	2	43	3	2	...
Ratio per 1,000 of strength { 1871 ...	...	...		13.16		13.16		19.05		66.77		...	
of strength { 1861-70 ...	...	6.86		17.52		26.83		31.71		57.92		62.50	

The numbers under observation are too few to admit of deductions being drawn from the results of one year. The average of the ten years shows a rapid increase in the rate of mortality with the advance of life.

XI.—ON THE HEALTH OF THE TROOPS SERVING IN CHINA, JAPAN, AND THE STRAITS SETTLEMENTS.

Section I.

Sickness and Mortality.

I.—CHINA.

STATISTICAL REPORT.

1. EUROPEAN TROOPS.

In the beginning of the year, the troops employed in China consisted of a battery of Royal Artillery, a detachment of Royal Engineers, and the Head-Quarters and four companies of the 75th Regiment. In the middle of August the Head-Quarters and 4 companies of the 1st Battalion 10th Regiment from Japan relieved the 75th Regiment, which embarked for the Cape of Good Hope.

China¹

The average strength of the European troops in China during the year was 516; the admissions into hospital were 681, and the deaths 3. These numbers give the ratio of 1,320 admissions and 5·82 deaths per 1,000 of mean strength—both much under the proportion in the preceding year.

The following table, framed from Abstract No. 17 in the Appendix, shows the admissions and deaths by each class of diseases:—

China.

Order.	Strength	516.				Ratio per 1,000 of Mean Strength.			
		Admitted.	Died.			1871.		1869-70.	
			In China.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile Group ..	282	..	..	..	449·6	..	655·4	·89
2	Constitutional Group	59	..	..	..	114·3	..	106·9	5·34
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	9	1	..	1	17·6	1·94	16·0	·89
2	Eye	8	..	..	..	15·5	..	39·2	..
3	Ear	4	..	..	..	7·8	..	13·4	..
4	Nose	1	..	..	..	1·9	..	2·7	..
5	Circulatory System ..	3	..	..	..	5·8	..	16·0	3·56
6	Absorbent	8	..	..	..	5·8	..	3·6	..
8	Respiratory	11	1	..	1	21·8	1·94	41·0	·89
9	Digestive	148	..	..	..	286·8	..	293·0	·89
10	Urinary	56	..	..	..	108·6	..	100·6	..
11	Generative	10	..	..	..	19·4	..	34·7	..
12	Organs of Locomotion ..	1	..	..	..	1·9	..	2·7	..
13	Cellular Tissue	13	..	..	..	25·2	..	18·7	..
14	Cutaneous System ..	57	..	..	..	110·6	..	76·7	..
	III. Conditions, &c.								
	Debility	7	..	..	..	13·6	..	7·1	·89
	IV. Poisons	5	1	..	1	9·7	1·94	22·2	1·78
	V. Injuries.								
2	Accidental	0	..	..	..	96·8	..	111·1	·89
	VI. Surgical Operations	..	..	..	..	..	..	2·7	..
	No appreciable Disease	4	..	..	..	7·8	..	2·7	..
	Total.. ..	681	3	..	3	1319·7	5·82	1565·4	16·02
	Average of 10 years, 1869-70 .. ..	} ..	..	..	..	2004·7	39·84	..	..

GENERAL DISEASES were only half as prevalent as in 1870, and gave rise to no deaths. The reduction was confined to the febrile group, there being an increase of 19 per 1,000 in the constitutional group. The admissions by the principal diseases comprised in this class were as follows:—

General Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers	65	..	126·0	..	8·5	..
Continued „	159	..	308·1	..	645·6	89
Paroxysmal „	6	..	11·6	..	2·7	..
Influenza	2	..	3·9	..	1·8	..
Erysipelas .. .. .	..	..	..	..	·9	..
Other diseases of this group	..	..	..	..	..	..
<i>Constitutional—</i>						
Rheumatism	10	..	19·3	..	22·3	..
Syphilis	47	..	91·1	..	64·1	..
Scrofula, Phthisis, &c. ..	2	..	3·9	..	17·8	5·84
Scurvy and Purpura .. ..	..	..	..	..	·9	..
Anæmia .. .. .	..	..	..	..	1·8	..

There was a considerable increase in the admissions by *continued fevers*, but 60 of the cases were returned under the head of *febricula*, and a large proportion of these was probably the result of intemperance.

Paroxysmal Fevers were very much less prevalent than in 1870, but were still a considerable cause of inefficiency. The cases were chiefly of the remittent form, and the 75th Regiment furnished much the largest proportion of them, 126 out of 140 cases of remittent fever having occurred in it.

There was a slight increase in the admissions for *rheumatism*, and an increase of 34 per 1,000 in those for *syphilis*. A large proportion of the cases were secondary syphilis, and as half of these occurred in the 10th Regiment, it is probable they were to a great extent the consequence of primary disease contracted in Japan.

LOCAL DISEASES.—*Ophthalmia*, which in 1870 was exceptionally high, fell to about the average of previous years. There was a decrease in *diseases of the circulatory system*, but an increase in those of the *urinary system*, chiefly gonorrhœa, and in those of the *cutaneous system*.

ACCIDENTAL INJURIES were considerably lower than in 1870, and, as in that year, no self-inflicted injuries appear in the returns.

2. NATIVE OR ASIATIC TROOPS.

The Asiatic troops during the year consisted of the Gun Lascars and the 13th Regiment of Madras Native Infantry. Their average strength was 936; the admissions into hospital during the year were 1,174, and the deaths were 7. The admissions were in the ratio of 1,254, and the deaths of 7·48 per 1,000 of mean strength; both lower than in the preceding year, but particularly the deaths.

The following table, framed from Abstract No. 17 in the Appendix, shows the influence of the different classes of diseases on the sickness and mortality:—

China.

Orders.	NATIVE TROOPS.	Average Strength, 986.		Ratio per 1,000 of Mean Strength.			
		Admitted.	Deaths.	1871.		1869-70.	
	Diseases.			Admitted.	Died.	Admitted.	Died.
	I. General Diseases.						
1	Febrile Group	401	1	428.4	1.07	525.6	3.45
2	Constitutional Group ..	52	1	55.6	1.07	51.1	2.87
	II. Local Diseases.						
	Diseases of the—						
1	Nervous System	9	1	9.6	1.07	10.9	2.87
2	Eye	3	..	3.2	..	3.0	..
3	Ear.. ..	2	..	2.1	..	..	..
4	Nose .. ..	..	..	..	..	.6	..
5	Circulatory System ..	2	..	2.1	..	1.7	2.30
8	Respiratory	47	1	50.3	1.07	48.1	..
9	Digestive	291	3	310.8	3.20	177.5	2.30
10	Urinary	16	..	17.1	..	11.5	9.76
11	Generative	11	..	11.8	..	2.3	..
12	Organs of Locomotion ..	8	..	8.6	..	.6	..
13	Cellular Tissue	80	..	82.1	..	25.3	..
14	Cutaneous System ..	240	..	256.4	..	52.3	..
	III. Conditions, &c.						
	Debility	11	..	11.8	..	19.5	..
	IV. Poisons.	..	..	..	..	3.5	.57
	V. Injuries.						
2	Accidental.. ..	49	..	52.4	..	30.4	..
	VI. Surgical Operations..	2	..	2.1	..	..	..
	No appreciable disease ..	..	..	..	..	.6	..
	Total	1,174	7	1254.3	7.48	965.0	24.12
	Average of 10 years, 1861-70 .. ..	} ..	..	1182.4	26.46	..	..

GENERAL DISEASES were much less prevalent than in 1870, the reduction being confined, however, to the febrile group. The admissions and deaths by the principal diseases of this class were as follows :—

China.

General Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers	25	..	26·7	..	2·9	..
Continued „	2	1	2·1	1·07	1·2	..
Paroxysmal „	374	..	399·6	..	521·5	3·44
<i>Constitutional—</i>						
Rheumatism	39	..	41·7	..	33·8	·54
Syphilis	5	..	5·3	..	7·5	..
Scrofula, Phthisis, &c... ..	4	1	4·3	1·07	2·3	1·15
Anæmia	2	..	2·1	..	·5	..
Other Diseases.. .. .	2	..	2·1	..	7·5	1·15

Eruptive Fevers were greatly in excess of the preceding year, from the prevalence of smallpox. This disease prevailed as an epidemic among the civil population of Hong Kong in the beginning of the year, and extended to the native troops, among whom 25 cases occurred without a death. Nineteen of the cases bore satisfactory marks of vaccination, four of smallpox, and one had no satisfactory mark. All the cases were of a mild form.

Paroxysmal Fevers were much less prevalent than in 1870, but were still the cause of nearly one-fourth of the admissions. The cases were all returned as ague. There was a considerable increase in the prevalence of *rheumatism*, and *syphilis* gave rise to a very small proportion of the sickness.

LOCAL DISEASES.—There was a considerable increase in the ratio of admissions by diseases of the *digestive system*, chiefly from the prevalence of diarrhoea in April, May, June, and September, and of dysentery in January, and a very marked increase in diseases of the *cutaneous system*. The latter was principally due to the prevalence of itch, of which 139 cases occurred in the Madras Regiment, and 12 among the Gun Lascars. The admissions by ulcers and boils were also more numerous than in the preceding year.

INJURIES.—There was an increase of 12 per 1,000 in accidental injuries; but, as in 1870, there was no case of self-inflicted injury.

SANITARY REPORT.

Deputy-Inspector General Crocker states that, having recently arrived in this Command, he is unable to state anything from personal observation with regard to the health of the troops during the period of this report, but having carefully perused the reports from the several Medical Officers, he finds they all concur in stating that the year was exceptionally healthy.

As regards the white troops, the amount of sickness has been considerably less than in the preceding year, the decrease being specially marked in malarious diseases of a remittent type, which are generally owing to local or climatic causes.

The following sanitary improvements have been effected during the year.

Her Majesty's ship, "Meeanee," having been fitted up as a hospital for the reception of sick, and moored in the harbour, rendered the hospital on shore available for other purposes, and accordingly the main block has been

China.

converted into barracks for men, and the west block for officers' quarters. This increased accommodation has, no doubt, had a beneficial effect on the health of the occupants.

In the north barracks a new ablution room, latrines, urinals, and bath-rooms have been erected, and the old buildings removed.

In the Victoria Barracks the drainage has been improved by making a surface drain at the back of the east block, and bamboos have been planted about them, as recommended by the former Principal Medical Officer.

In the Murray Barracks, the ventilation of No. 3 and 4 officers' quarters, which was very defective, has been improved; and in the Fletcher Barracks cook-houses have been fitted up, and the drainage improved in the rear of the buildings. Lastly, punkahs have been provided for the hospital ship "*Meeanee*," which has contributed materially to the comfort of the patients during the hot weather.

The lighting of the several barracks is still effected by means of the old oil-lamps, which afford a miserable and insufficient light, and it is very desirable that gas, which is now in general use in the city, should be extended to the buildings occupied by the troops.

II. JAPAN.

STATISTICAL REPORT.

The garrison of Japan consisted of the 1st Battalion 10th Regiment, with detachments of Royal Artillery and Royal Engineers, till the 7th August, when it was withdrawn, and replaced by Royal Marines. The average strength of the garrison during that period was 658, representing an average *annual* strength of 395. The admissions into hospital were 698, and the deaths 14, including one of an invalid at Hong Kong on his way to England. The annual ratio of admissions, therefore, was 1,767, and of deaths 35.44 per 1,000 of mean annual strength; both considerably in excess of the results of the preceding year.

The following table, framed from Abstract No. 17 in the Appendix, shows the admissions and deaths by the different classes of diseases:—

Orders.	Average Annual Strength, 395.	Admissions.	Deaths.			Ratio per 1,000.			
	Diseases.		In Japan.	Of Invalids.	Total.	1871.		1869-70.	
						Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile Group ..	241	8	..	8	610·1	20·26	169·0	3·86
2	Constitutional „ ..	101	..	1	1	255·7	2·53	301·7	·77
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	4	1	..	1	10·1	2·53	17·0	1·54
2	Eye	29	..	..	..	73·4	..	129·6	..
3	Ear	1	..	..	..	2·5	..	4·6	..
5	Circulatory System..	1	..	..	..	2·5	..	13·1	3·86
6	Absorbent „ ..	3	..	..	..	7·6	..	..	..
8	Respiratory „ ..	40	..	..	..	101·3	..	59·4	·77
9	Digestive „ ..	41	..	..	..	103·8	..	105·7	..
10	Urinary „ ..	117	..	..	..	296·2	..	371·1	·77
11	Generative „ ..	2	..	..	..	5·1	..	19·3	..
12	Organs of Locomotion	1	..	..	..	2·5	..	1·5	..
13	Cellular Tissue ..	3	..	..	..	7·6	..	22·4	..
14	Cutaneous System ..	44	..	..	..	111·4	..	92·6	..
	III. Conditions, &c.								
	Debility	9	..	..	..	22·8	..	3·9	..
	IV. Poisons	9	1	..	1	22·8	2·53	27·8	·77
	V. Injuries.								
2	Accidental	49	2	..	2	124·1	5·06	130·4	·77
4	Self-inflicted .. ..	..	1	..	1	..	2·53	..	·77
	No Appreciable Disease	3	..	..	..	7·6	..	3·1	..
	Total	698	13	1	14	1767·1	35·44	1472·2	13·88
	Average of 7 years } 1864-70.	..	..	..	..	1494·4	19·04	..	..

GENERAL DISEASES.—The febrile group was nearly thrice as prevalent, and more than four times as fatal, as in 1870; but there was a decrease in the prevalence of the constitutional group.

Eruptive Fevers.—It was stated in last Report that smallpox in an epidemic form had spread from the civil population to the troops, and was still prevailing at the end of the year. It continued among them till the beginning of February, causing 14 admissions and 2 deaths. All the cases bore satisfactory marks of previous vaccination. During this period also, an officer, who had been attacked in December, died. Three women were attacked, of whom one died; and four children, all of whom recovered.

Continued Fevers.—There was a great prevalence of enteric fever, sixty cases having been admitted, of whom six died. The disease broke out among the troops in June, and continued till the date of their withdrawal. It was not at the time epidemic among the civil population. During the prevalence of this epidemic the admissions for simple continued fever and febricula were unusually numerous.

Rheumatism was much more prevalent than in 1870, but there was a marked reduction in the cases of *primary syphilis*, the annual ratio of admissions by which, however, still amounted to 94 per 1,000, and by *secondary syphilis* to 71 per 1,000.

Japan.

There were 12 cases of *scurvy* admitted. They occurred in men who had arrived from England in the "Golden Eagle," and are stated to have been the result of a very insufficient supply of lime juice, and the limited quantity of preserved vegetables on board that vessel.

LOCAL DISEASES. — There was a reduction in the prevalence of *diseases of the circulatory and digestive systems*, and a very marked one in cases of gonorrhoea, included with *diseases of the urinary system*; and there was a moderate increase in *diseases of the respiratory and cutaneous systems*.

POISONS. — The admissions by delirium tremens and alcoholic poisoning were only half as numerous as in 1870, but one of the cases proved fatal.

SANITARY REPORT.

Surgeon Orton, 1st Battalion, 10th Regiment, writes, in his Sanitary Report for 1871, as follows :—

"The conclusions to which the last period of service at Yokohama has brought me are—1. That new huts are absolutely necessary should troops continue to be quartered there, and these should be built on a better plan and of better materials; 2. That the camp requires an organized system of drains; 3. That the latrines as they now are cannot but be sources of pollution to the air all about them, and of danger to any one entering them; 4. That punkahs are necessary at night during the hot weather, and that means should be taken to check the breeding of mosquitoes in camp; 5. That attractive employment should be found for the men during their leisure time. That the duties should be lightened as far as possible, and that the camp should be made more comfortable and more attractive."

III.—STRAITS SETTLEMENTS.

STATISTICAL REPORT.

I. WHITE TROOPS.

Straits Settlements.

The troops employed in the beginning of the year consisted of two Batteries of Royal Artillery, and the left wing of the 75th Regiment. Early in September the left wing of the 1st Battalion 10th Regiment arrived from Japan to relieve the 75th, which embarked for the Cape of Good Hope.

The average strength of white troops for the year was 571; the admissions into hospital were 907, and the deaths 10, including 2 of invalids at Netley. These numbers give the ratio of 1,588 admissions and 17.55 deaths per 1,000 of mean strength, both much higher than in the preceding year.

The influence of the different classes of diseases in causing this sickness and mortality is shown by the following table, framed from Abstract No. 17 in the Appendix :—

Orders.	Diseases.	Mean Strength, 571.	Admissions.	Deaths.			Annual Ratio per 1,000 of Strength.				Straits Settlements.
				In Straits Settlements.	Of Invalids.	Total.	1871.		1869-70.		
							Admitted.	Died.	Admitted.	Died.	
1	I. General Diseases.										
2	Febrile Group ..	328	1	..	1	574.4	1.75	232.9	..		
3	Constitutional „ ..	102	3	1	4	178.6	7.06	122.3	2.69		
	II. Local Diseases.										
	Diseases of the—										
1	Nervous System ..	5	1	..	1	8.8	1.75	21.6	..		
2	Eye	8	..	..	..	14.0	..	11.7	..		
3	Ear	13	..	..	..	22.8	..	13.5	..		
5	Circulatory System..	12	..	..	..	21.1	..	27.0	..	90	
6	Absorbent „ ..	12	..	..	..	21.1	..	18.0	..		
8	Respiratory „ ..	23	..	..	..	49.0	..	48.5	..	90	
9	Digestive „ ..	183	1	..	1	320.5	1.75	297.6	1.80		
10	Urinary „ ..	49	..	..	..	85.8	..	112.4	..		
11	Generative „ ..	8	..	..	..	14.0	..	29.7	..		
12	Organs of Locomotion	3	..	1	1	5.2	1.75	2.7	..		
13	Cellular Tissue ..	13	..	..	..	22.8	..	30.6	..		
14	Cutaneous System ..	70	..	..	..	122.6	..	108.8	..		
	III. Debility. ..	3	..	..	..	5.2	..	..	..
	IV. Poisons. ..	8	1	..	1	14.0	1.75	12.6	..	90	
	V. Injuries.										
2	Accidental	61	..	..	..	106.8	..	150.2	..		
4	Self-inflicted .. ..	..	1	..	1	..	1.75	.9	..		
	VI. Surgical Operations										
	No appreciable disease ..	1	..	..	..	1.8	..	.9	..		
	Total	907	8	2	10	1588.5	17.55	1242.8	7.19		
	Average of seven years } 1864-70	..	..	..	..	1432.2	10.47	..	..

GENERAL DISEASES.—There was a very great increase in the prevalence of both groups of these diseases, but most marked in the febrile group. The increase in it was due to the prevalence of ague and febricula, the admissions by both having been more than twice as numerous as in the preceding year. The increase in the constitutional group was almost entirely in cases of syphilis, the admissions by which were as high as 119 per 1,000 of the strength.

LOCAL DISEASES.—There was a reduction in the amount of diseases of the nervous system, chiefly neuralgia; of the circulatory system, both in valve disease of the heart and in palpitation; of the digestive system, particularly dyspepsia and hepatitis, but somewhat counterbalanced by an increase of diarrhoea and dysentery; and of the generative system in orchitis while there was a slight increase in some of the other classes, especially diseases of the cutaneous system.

INJURIES.—There was a very marked decrease in accidental injuries. One death occurred from accidental poisoning, by cyanide of potassium, in the Acting Master Tailor of the wing of the 75th Regiment, who swallowed a solution of

*Straits
Settlements*

it by mistake for quinine. There was also one death by self-inflicted injury—that of a private of the 75th Regiment, who shot himself with his rifle.

2. ASIATIC TROOPS.

In the middle of March, the 19th relieved the 7th Regiment of Madras Native Infantry. The average strength of the Asiatic troops during the year was 627; the admissions into hospital were 1,120, and the deaths 11, being respectively in the ratio of 1,786 and 17.54 per 1,000 of mean strength.

The following table, framed from Abstract No. 17 in the Appendix, shows the admissions and deaths by the different classes of diseases:—

Order.	ASIATIC TROOPS.	1871.			
		Strength, 627.		Ratio per 1,000.	
	Diseases.	Admissions.	Deaths.	Admitted.	Died.
	I. General Diseases.				
1	Febrile Group	416	2	663.5	3.19
2	Constitutional „	99	1	157.9	1.60
	II. Local Diseases.				
	Diseases of the—				
1	Nervous System	10	..	16.0	..
2	Eye	54	..	86.1	..
3	Ear	11	..	17.5	..
5	Circulatory System	2	..	3.2	..
8	Respiratory	17	1	27.1	1.60
9	Digestive	241	7	384.4	11.15
10	Urinary	8	..	12.7	..
11	Generative	4	..	6.4	..
12	Organs of Locomotion	8	..	4.8	..
13	Cellular Tissue	15	..	23.9	..
14	Cutaneous System	167	..	266.4	..
	III. Conditions, &c.				
	Debility	17	..	27.1	..
	V. Injuries.				
2	Accidental	56	..	89.3	..
	Total	1120	11	1786.3	17.54

There are no returns of the Asiatic troops available for previous years.

GENERAL DISEASES.—The febrile group of this class gave rise to a very high ratio of admissions, almost entirely from the prevalence of ague. Two deaths occurred—one from enteric, and the other from remittent fever. The ratio of admission by the constitutional group was high, four-fifths of the cases being rheumatism. There was very little syphilis among the Asiatic troops, only seven cases of primary, and eight of secondary, having been admitted.

LOCAL DISEASES.—*Ophthalmia* was a cause of considerable inefficiency, the *Straits* admissions by it having amounted to 81 per 1,000 of the strength. *Diseases of Settlements.* *the digestive system* were very prevalent, particularly dysentery, diarrhoea, dyspepsia, and colic. The mortality by this class chiefly arose from dysentery, six out of seven deaths having been caused by it. The very high ratio of admissions by *diseases of the cutaneous system* was principally due to ulcers, boils, and itch.

INJURIES.—There were no deaths under this class, either accidental or self-inflicted.

SANITARY REPORT.

Surgeon-Major Reade reports that the sanitary condition of the barracks and hospitals, and the general health of the troops, throughout the year, have been satisfactory.

Section II.

On the Extent of Invaliding.

In consequence of the interchange of troops between China, Japan, and the Straits Settlements during the year, it appears more advisable to state generally the invaliding from the three Stations than to enter into details for each separately. During the year there were 82 men of the European Force sent to England, and 77 finally discharged the Service at Netley, being in the ratio respectively of 55·3 and 52·0 per 1,000 of mean strength. *China, Japan, and Straits Settlements.*

There were 12 men of the Asiatic Force in China sent to India as invalids, being in the ratio of 12·8 per 1,000 of the strength, and considerably under the proportion in the preceding year.

The following Table, framed from Abstract No. 17 in the Appendix, shows the classes of diseases which were the cause of this amount of invaliding.

Mean Strength	White Troops		Asiatic Troops
	1,482		936
	Sent as Invalids to England.	Discharged as Invalids in England.	Sent as Invalids to India.
Paroxysmal Fevers	16	3	1
Rheumatism	2	2	2
Syphilis	9	3	..
Scrofula and Phthisis	8	17	1
Anæmia .. .. .	..	1	..
Diseases of the—			
Nervous System	4	2	..
Eye and Ear	1	12	..
Circulatory System	9	8	..
Respiratory „	3	3	3
Digestive „	21	15	3
Urinary „ .. .. .	..	1	..
Generative „	3	..	..
Organs of Locomotion.. .. .	..	1	..
Cutaneous System	3	3	..
General Debility	3	5	2
Accidental Injuries .. .. .	..	1	..
Total	82	77	12
Annual ratio per 1,000 of { 1871 ..	55·3	52·0	12·8
Mean Strength.. .. { 1864-70 ..	59·6	46·5	31·3

*China, Japan,
and Straits
Settlements.*

The ratio of invalids sent to England has been a little under, and of those discharged the Service a little above, the average of the preceding seven years. Paroxysmal fevers, dysentery, and hepatitis were the chief causes of disability of the invalids sent home; phthisis, dysentery, and hepatitis of those finally discharged. Ophthalmia also furnished a large proportion of the latter, the men having been sent home from Japan, where the disease was very prevalent in 1869 and 1870. The proportion of invalids sent to India from China was very low.

Section III.

Mean Daily Sick.

The average numbers constantly non-effective from sickness during the year were, of the European troops, in China 31, in Japan, after the necessary correction for the broken period, 29, and in the Straits Settlements 35; of the Asiatic troops in China 40. No return has been furnished of the mean sick of the Asiatic troops at the Straits Settlements.

The following Table gives the usual information on this subject, calculated from the preceding numbers:—

	European Troops.			Asiatic Troops.
	China.	Japan.	Straits Settlements.	China.
Ratio per 1,000 of Strength constantly Sick	1871 .. 60·11 1864-70 84·24	1871 .. 73·84 1864-70 88·33	1871 .. 61·40 1864-70 *51·58	1871 .. 42·73 1864-70 46·14
Average Sick time to each Soldier	1871 .. 21·93 1864-70 30·75	1871 .. 26·79 1864-70 30·41	1871 .. 22·37 1864-70 *18·83	1871 .. 15·60 1864-70 16·84
Average duration of Cases	1871 .. 16·47 1864-70 15·46	1871 .. 17·41 1864-70 20·35	1871 .. 14·08 1864-70 *14·61	1871 .. 12·44 1864-70 15·13

* Average of three years 1868-70.

Compared with the results of the preceding year, there has been a considerable decrease in the average constantly non-effective from sickness of the European troops, and in the sick time to each soldier in China and Japan, but the proportion has been almost identical in the two years in the Straits Settlements. There has been a slight increase in the duration of the cases in China, but a decrease of nearly four days in Japan and the Straits. There has been a slight increase in the mean sick and average sick time to each soldier of the Asiatic force in China, but a trifling decrease in the duration of the cases. If the comparison be made with the average of the last seven years for China and Japan, the decrease is more marked in all the particulars, except the duration of the cases among the European troops in China, which in 1871 was one day above the average.

Section IV.

Influence of Age on the Mortality.

Owing to the numerous changes in the European troops during the year, *China, Japan,* consequent upon their withdrawal from Japan, and their re-distribution in *and Straits* China and the Straits Settlements, the information respecting the ages is not *Settlements.* available. The following Table shows the influence of age on the mortality among the Asiatic troops in China :—

	ASIATIC TROOPS.											
	Under 20.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Gun Lascars	5	..	83	..	18	..	15	..	6	..	4	..
13th Madras N.I. ..	99	..	136	1	160	..	189	4	155	1	117	1
Total	104	..	169	1	178	..	204	4	161	1	121	1
Ratio of { 1871 ..	..		5·92		..		19·60		6·21		8·26	
Deaths { 1864-7 } per 1,000 { and 9 }			21·47		24·82		39·47		54·64		36·04	

The numbers under observation were too small to justify any deductions from the results for one year, but the average of three preceding years, for which alone returns of the Asiatic troops having been available, show a rapid increase of mortality with the advance of life.

XIII.—ON THE HEALTH OF THE TROOPS SERVING IN INDIA.

*Section I.**Sickness and Mortality.**India.*

THE average strength of the European troops serving in the Indian Commands during 1871 was 56,974 men, among whom there occurred 81,708 admissions into hospital, and 1,065 deaths, including 70 among invalids on their passage home and at Netley. The ratio of admissions therefore was 1,434, and of deaths 18·69 per 1,000 of mean strength, both considerably lower than in the preceding year. The admissions were slightly and the deaths nearly one-third under the average of the last ten years.

The sickness and mortality in each of the Presidencies during the year were as follows:—

	Average Strength.	Admissions into Hospital.	Deaths.			Ratio per 1,000 of Mean Strength.			
			In India.	Of Invalids.	Total.	1871.		1861-70.	
						Admitted.	Died.	Admitted.	Died.
Bengal	35,452	52,528	630	50	680	1,482	19·18	1,635	29·67
Madras	10,684	12,944	215	13	228	1,211	21·35	1,371	22·62
Bombay	10,838	16,236	150	7	157	1,498	14·48	1,481	21·30

The admissions were under the average of the preceding 10 years in the Bengal and Madras Presidencies, but slightly above it in the Bombay Presidency; in all three the mortality was below the average, but the reduction was much greater in Bengal and Bombay than in Madras. The ratio of admissions during the year was highest in Bombay and lowest in Madras; that of the deaths was highest in Madras and lowest in Bombay.

I.—BENGAL.

STATISTICAL REPORT.

Bengal.

The average strength of the European troops in the Bengal Presidency during the year was 35,452; the admissions into hospital among them amounted to 52,528, and the deaths, including those of invalids on their passage home and at Netley, to 680, being respectively in the ratio of 1,48 and 19·18 per 1,000 of mean strength, both considerably lower than in the preceding year.

The admissions and deaths by the different classes of diseases are shown in the following Table, framed from Abstract No. 18 in the Appendix :—

Bengal.

Orders.	Diseases.	Strength, 35,452.				Ratio per 1,000 of Mean Strength.			
		Admitted.	Deaths.			1871.		1869-70.	
			In the Command.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	<i>General Diseases.</i>								
1	Febrile Group ..	21,005	169	..	169	592·5	4·77	796·9	13·32
2	Constitutional Group	6,110	67	23	90	172·8	2·53	173·8	2·86
	<i>Local Diseases.</i>								
	<i>Diseases of the—</i>								
1	Nervous System ..	613	51	2	53	17·3	1·49	22·0	3·39
2	Eye	858	..	..	..	24·2	..	25·7	..
3	Ear	288	..	..	..	8·0	..	6·8	..
4	Nose	16	2	..	2	·4	·06	·8	..
5	Circulatory System ..	624	60	6	66	17·6	1·86	14·8	1·74
6	Absorbent	652	..	..	..	18·4	..	16·1	..
7	Ductless Glands ..	2	..	..	..	·1	..	·1	·02
8	Respiratory System ..	2,177	49	8	52	61·4	1·47	51·4	1·43
9	Digestive	8,931	155	11	166	251·9	4·68	270·7	8·82
10	Urinary	3,806	8	4	12	107·3	·34	102·0	·55
11	Generative	591	..	..	..	16·7	..	15·6	..
12	Organs of Locomotion	187	1	..	1	5·3	·03	5·1	·02
13	Cellular Tissue ..	504	..	..	..	14·2	..	11·0	·08
14	Cutaneous System ..	2,263	..	..	..	63·8	..	71·2	·02
	<i>III. Conditions, &c.</i>								
	Debility	591	3	1	4	16·7	·11	13·7	·14
	<i>IV. Poisons</i>	149	11	..	11	4·2	·31	6·6	·49
	<i>V. Injuries.</i>								
2	Accidental	3,120	32	..	32	88·0	·90	85·9	·87
3	Homicidal .. ..	..	1	..	1	..	·03	..	·07
4	Self-inflicted	9	20	..	20	·3	·57	·4	·59
6	Judicial .. ..	..	..	..	..	..	..	..	·02
	<i>VI. Surgical Operations</i>	13	1	..	1	·4	·03	·2	·02
	No appreciable disease	24	..	..	..	·7	..	·8	..
	Total	52,528	630	50	680	1481·7	19·18	1691·6	34·45
	Average of 10 years } 1861-70.. ..	..	..	..	..	1635·3	29·67	..	..

GENERAL DISEASES.—There was a marked reduction in the prevalence, and a trifling one in the mortality by these diseases compared with the results for 1870. The decrease was almost entirely in the febrile group.

The admissions and deaths by the principal diseases comprised in this class were as follows :—

Bengal.

General Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers.. ..	38	2	1·1	·06	2·7	·31
Continued „	4,683	68	132·1	1·92	208·0	2·84
Paroxysmal „	16,089	70	453·8	1·98	656·3	2·94
Malignant Cholera	42	25	1·3	·71	13·5	8·99
Influenza.. ..	46	..	1·3	..	2·4	..
Erysipelas	97	3	2·7	·08	1·8	·08
Other Diseases	10	1	·3	·03	..	..
<i>Constitutional—</i>						
Rheumatism	1,960	1	55·3	·03	59·7	·03
Syphilis	3,517	3	99·2	·08	107·7	·26
Scrofula, Phthisis, &c. ..	343	77	9·7	2·17	14·2	..
Scurvy and Purpura	14	..	·4	..	·8	..
Anæmia	286	1	6·7	·03	9·7	·06
Other Diseases	40	8	1·1	·23	1·1	·18

Eruptive Fevers were very slightly more prevalent than in 1870, the increase being in cases of measles. There were only 11 cases of small-pox with one death. None of these diseases prevailed in an epidemic form among the troops.

Continued Fevers were less prevalent than in the preceding year, and there was a reduction of '30 per 1,000 in the mortality by them.

Paroxysmal Fevers were much less prevalent than in 1870, the reduction in the admissions amounting to 186 per 1,000 of mean strength. The mortality in the two years was almost identical.

Malignant Cholera was less prevalent than in any of the last 10 years and less fatal than in any except 1870, when the ratio of deaths by it was a fraction lower. It can hardly be said to have prevailed as an epidemic in any of the European corps serving in the Command. The 104th Regiment at Allahabad, and the 1st Battalion 17th Regiment at Lucknow, had the greatest number of deaths, amounting to 7 and 6 respectively.

Rheumatism and *Syphilis* differed very little from the amount in the preceding year. There was a slight decrease in the proportion of cases of *scrofula* and *phthisis*, but there was an increase of '35 per 1,000 of mean strength in the deaths by them. There was a reduction also in the proportion of cases of *anæmia*, a result, perhaps, of the decrease in the prevalence of paroxysmal fevers.

LOCAL DISEASES.—There was a remarkable uniformity in the results of the two years in the admissions by local diseases. The classes in which the greatest difference occurred were *diseases of the respiratory* and of the *urinary systems*, which showed an increase of only 6 and 7 respectively per 1,000 of mean strength. There was a very marked reduction, however, in the mortality by *diseases of the digestive system*, amounting to 3 per 1,000, and occurring chiefly in dysentery and hepatitis. There was also a reduction in the proportion of deaths by *diseases of the nervous and respiratory systems*, occurring in the former in sunstroke, and in the latter principally in pneumonia.

INJURIES.—There was a slight decrease in the proportion of deaths by *accidental* and increase in those by *self-inflicted injuries*. Of the latter 11 were caused by gunshot wounds, 4 by drowning, 2 by poison (cyanide of potassium in both cases), and 1 each by hanging, cut-throat, and multiple injury.

SURGICAL OPERATIONS.—One death followed amputation of the thigh.

which was performed on account of severe injury from an accidental gunshot wound. *Bengal.*

The following Table shows the admissions and deaths during the year at the principal stations in this Command :—

Stations.		Average Annual Strength.	Admitted into Hospital.	Died in India.	Annual Ratio per 1,000.			
					1871.		1865-70.	
					Admitted.	Died.	Admitted.	Died.
Presidency	Calcutta ..	895	995	9	1286.0	11.12	1453.0	25.73
	Dum-Dum ..	670	720	12	1074.6	17.91	..	..
	Barrackpore ..	497	856	16	1722.3	32.19	1721.7	34.33
	Hazareebaugh..	887	1,228	15	1384.4	16.91	1409.7	20.12
	Darjeeling ..	67	74	3	1104.5	44.77	..	..
Allahabad	Allahabad ..	765	1,366	21	1785.6	27.45	1785.6	53.33
	Cawnpore ..	824	1,805	12	2190.5	14.56	1408.0	22.49
	Dinapore ..	944	1,144	23	1211.9	24.36	1621.8	23.91
	Benares ..	512	647	14	1263.7	27.34	1805.7	28.21
Oude ..	Lucknow ..	2,415	2,856	43	1099.8	17.82	1253.5	27.88
	Seetapore ..	607	492	8	810.5	13.18	1127.4	19.82
	Fyzabad ..	923	816	11	884.1	11.92	1125.5	29.20
Saugor ..	Saugor.. ..	606	978	6	1613.9	9.90	2214.9	29.85
	Nowgong ..	296	641	8	2165.5	27.02	1280.8	24.60
	Jubbulpore ..	311	418	6	1344.1	19.29	2210.6	40.08
	Puchmuree ..	74	152	5	2054.1	67.57	..	..
Rohilcund	Bareilly ..	797	636	10	798.0	12.55	973.7	13.30
	Shahjehanpore	393	878	6	2234.1	15.27	1320.2	22.00
	Moradabad ..	180	193	2	1072.2	11.11	1056.9	16.53
	Raneekhet ..	381	681	9	1787.4	28.62	..	..
Gwalior	Morar	1,063	2,535	18	2373.5	16.93	2362.6	47.71
	Fortress Gwalior	303	898	4	1313.5	13.20	1330.5	31.12
	Jhansi	471	1,439	9	3055.2	19.11	2402.8	20.93
Meerut ..	Meerut	1,556	3,248	33	2037.4	24.42	1567.3	34.55
	Agra	929	1,345	26	1447.8	27.99	1403.4	20.50
	Delhi	410	846	17	2063.4	41.66	1816.8	30.10
	Muttra	393	550	6	1399.5	15.27	1113.7	15.63
	Roorkee	324	560	3	1728.4	9.26	1426.9	18.78
	Futtyghur ..	160	233	4	1456.3	25.00	1318.6	20.04
Sirhind ..	Umballa	1,099	1,442	21	1312.1	19.11	1418.3	16.60
	Jullundur ..	722	798	11	1103.3	15.24	1367.4	21.95
	Dugshai	906	1,141	5	1259.4	5.52	843.7	8.56
	Subathoo ..	750	696	8	936.7	10.67	1338.8	21.64
	Jutogh.. ..	72	41	..	569.4	..	..	..
	Chuckratra ..	767	549	5	715.8	6.52	..	..
Lahore ..	Lahore.. ..	1,124	1,759	29	1564.9	25.80	2161.5	35.90
	Ferozepore ..	1,063	1,160	12	1091.8	11.29	1590.5	17.29
	Mooltan	844	855	17	1013.0	20.14	1368.7	21.33
	Bhagsoo	55	114	..	1965.6	..	..	..
	Working Parties	292	276	..	945.2	..	..	..

Bengal.

Stations.		Average Annual Strength.	Admitted into Hospital.	Died in India.	Annual Ratio per 1,000.			
					1871.		1865-70.	
					Admitted.	Died.	Admitted.	Died.
Rawul Pindée..	{ Sealkote ..	1,087	1,257	18	1156·4	16·56	1312·7	10·22
	{ Rawul Pindée..	1,385	2,430	22	1790·7	15·81	1661·8	14·10
	{ Working Parties	252	315	2	1250·0	7·94	..	..
	{ Campbellpore ..	111	418	1	3765·7	9·01	1229·1	17·35
	{ Attock..	165	309	2	1872·7	12·12	2074·3	24·44
	{ Dera Ismail Khan }	100	125	..	1250·0	..	1276·2	11·73
Peshawur..	{ Peshawur ..	1,531	3,463	31	2261·9	20·25	2632·8	56·91
	{ Nowshera ..	545	1,832	16	3361·5	29·36	2037·8	22·64
	{ Cheratt ..	300	650	11	2166·7	36·67	..	..
Troops on March, detached, &c.		1,447	1,783	14	1232·2	9·66	..	..
Convalescent Stations and Depôt Hospitals ..		1,391	2,634	41	1893·6	29·47	..	..

The ratio of admissions was extremely high at Campbellpore, but this was not due to the station itself; it was caused by the great prevalence of ague in the D Battery, A Brigade, Royal Horse Artillery during the last three quarters of the year, the admissions by that disease in it having been as high as 2,649 per 1,000 of mean strength. The Battery arrived at Campbellpore on the 5th April from Peshawur, and the Medical Officer in charge states that "the prevalence of ague among the men of the battery is entirely due to residence in Peshawur during the unhealthy season of 1870." Although the ratio of admissions was more than three-fourths higher than in the preceding year, it was attended with a decrease of more than one-half in that of the deaths. The ratio of admissions was also extremely high at Nowshera, and there was at that station a considerable increase also in the mortality. At Jhansi the admissions exceeded three times the mean strength, but with a mortality not above the average of the Command during the year; both admissions and deaths were slightly higher than in 1870. There was a decrease in the proportion of admissions at Peshawur to the amount of 707 per 1,000 of the strength, but this was in a great measure due to the removal of nearly half the force to Cheratt during the most unhealthy months, where they were encamped from the end of June till the middle of November. The admissions and deaths at the latter station were high, but were to a great extent the result of previous residence at Peshawur.

The ratio of mortality was extremely high at Puchmurree, a new station where a sanitarium has been established. Three of the deaths occurred in a detachment of the 79th Regiment from the Madras Presidency, and two in a detachment of the 1st Battalion 19th Regiment from Saugor. It was also considerably above the average at Delhi, Cheratt, and Barrackpore; but as already noted respecting the sickness, the high ratio of deaths at Cheratt was due to previous service at Peshawur.

The admissions and deaths by the different classes of diseases in each of the military divisions and districts of the Command are shown in the following Tables:—

Order.	Stations	Presidency, Allahabad.	Oude.	Saugor.	Bohileund.	Gwalior.	Meerut.	Sirhind.	Lahore.	Rawl Pindie.	Peshawar.	Depôa.	On the March.
Strength	...	2,926	3,945	1,287	1,762	1,938	3,772	4,317	3,383	3,101	2,377	1,391	1,447
Diseases.	...	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1	<i>I. General Diseases.</i>												
2	Febrile Group ...	1,072	9	1,663	26	598	1	2,692	8	2,828	35	1,444	8
3	Constitutional " ...	508	4	688	2	335	1	806	1	660	5	608	8
4	<i>II. Local Diseases.</i>												
5	Nervous System ...	67	3	57	6	43	1	32	1	82	7	60	2
6	Eye ...	91	...	107	...	45	...	48	...	96	...	77	96
7	Ear ...	41	...	33	...	17	...	10	...	41	...	20	...
8	Nose ...	...	...	...	...	1	...	3	...	...	...	...	...
9	Circulatory System ...	51	5	63	4	45	7	45	6	66	7	65	7
10	Alimentary ...	68	...	107	...	64	...	33	...	79	...	24	...
11	Ductless Glands ...	...	...	...	...	1	...	...	...	...	...	...	...
12	Respiratory System ...	104	3	111	2	147	3	155	2	391	6	256	5
13	Digestive " ...	897	23	943	23	523	10	474	8	1,823	25	884	12
14	Urinary " ...	314	1	337	...	213	1	472	1	472	1	449	1
15	Genital ...	61	...	64	...	34	...	20	...	52	...	35	...
16	Organs of Locomotion ...	10	...	29	...	13	...	6	...	38	...	29	...
17	Cellular Tissue ...	35	...	41	...	31	...	19	...	63	...	39	...
18	Cutaneous System ...	230	...	227	...	106	...	128	...	419	...	232	...
19	<i>III. Conditions, &c.</i>												
20	Debility ...	58	1	41	...	35	...	56	...	37	...	71	...
21	<i>IV. Poisons.</i>												
22	<i>V. Injuries.</i>												
23	Accidental ...	287	2	235	6	119	1	196	3	416	4	340	2
24	Homicidal ...	...	...	...	...	...	...	...	...	...	...	...	...
25	Self-inflicted ...	...	3	...	2	...	...	1	...	...	...	...	...
26	<i>VI.</i>												
27	Surgical Operations ...	1	...	...	2	2	...	...	...	4	...	1	...
28	No appreciable disease	3	2	5
29	Total ...	3,973	55	4,962	70	2,388	27	4,372	31	6,782	94	4,667	50
30													
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Bengal.

Ratio per 1,000 of Mean Strength.

Order.	Stations	Diseases.	Presidency		Allahabad.		Oude.		Saugor.		Rohilkund.		Gwalior.		Meerut.		Sirhind.		Lahore.		Rawul Pindée.		Peshawur.		Depôts.		On the March.	
			Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1		I. General Diseases.																										
2		Febrile Group	366.4	3.07	545.9	8.20	214.4	6.08	882.7	5.44	341.3	57.1464.6	4.35	669.7	9.28	334.5	1.85	403.5	2.07	777.8	3.54	1614.2	11.36	602.5	2.88	402.2	2.07	
3		Constitutional "	173.6	1.37	225.9	6.6	182.3	1.78	183.2	3.11	191.2	57.166.5	5.6	172.3	1.33	140.8	1.85	180.5	2.66	159.6	2.68	148.9	2.94	807.7	7.91	185.2	...	
4		II. Local Diseases.																										
5		Diseases of the—																										
6		Nervous System	22.9	1.03	18.7	1.97	8.4	1.52	20.2	...	24.6	57	17.4	5.5	21.7	1.86	13.9	.46	18.3	3.55	19.7	1.29	12.2	2.10	32.4	2.16	18.7	.69
7		Eye	31.1	...	35.1	...	27.6	...	19.4	...	25.7	...	26.1	...	25.5	...	17.8	...	28.4	...	17.1	...	17.3	...	20.1	...	17.3	...
8		Ear	14.0	...	10.8	...	8.4	...	3.1	...	9.7	...	5.4	...	10.9	...	4.6	...	6.6	...	4.5	...	14.7	...	7.9	...	2.8	...
9		Nose	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10		Circulatory System	17.4	1.71	20.7	1.31	10.1	.76	7.8	.78	25.7	4.00	24.5	3.28	17.5	1.86	15.1	1.62	27.2	1.77	10.6	.97	18.5	2.53	43.9	2.87	9.7	.69
11		Abdominal	23.2	...	35.1	...	28.4	...	23.3	...	36.5	...	18.0	...	20.9	...	5.6	...	7.1	...	7.7	...	19.4	...	16.5	...	20.0	...
12		Pneumonic Glands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13		Respiratory System	35.6	1.03	36.4	.66	31.9	.25	43.5	1.55	83.9	1.71	84.3	1.08	103.7	1.59	59.3	1.15	61.8	1.18	56.4	1.93	111.1	2.53	84.1	4.31	60.8	2.07
14		Digestive	303.2	7.96	310.3	7.65	175.4	3.30	186.5	6.99	301.4	5.71	257.9	4.33	350.7	6.83	193.2	2.78	226.7	2.66	211.9	2.58	231.1	2.10	451.5	5.75	211.5	1.38
15		Urinary	107.3	.84	176.3	...	106.7	...	142.2	...	124.4	...	76.2	.55	128.4	.26	104.0	.23	104.6	.59	100.3	.65	89.3	...	19.8	...	109.9	...
16		Generative	17.4	...	21.0	...	20.3	...	16.3	...	19.4	...	16.3	...	18.1	...	16.7	...	10.3	...	17.7	...	10.5	...	15.8	...	14.5	...
17		Organs of Locomotion	3.4	...	9.5	...	2.5	...	4.7	...	7.4	.57	3.3	...	10.1	...	6.7	...	2.1	...	5.5	...	2.1	...	9.4	...	6.2	...
18		Cellular Tissue	12.0	...	13.5	...	17.5	...	12.4	...	17.7	...	10.3	...	14.0	...	16.0	...	11.5	...	19.7	...	12.6	...	12.9	...	13.1	...
19		Cutaneous System	75.2	...	74.5	...	60.8	...	69.1	...	60.5	...	68.6	...	111.1	...	53.7	...	63.0	...	52.6	...	65.6	...	41.7	...	35.2	...
20		III. Conditions, &c.																										
21		Debility	10.6	.34	13.5	...	22.8	.25	1.6	...	20.0	...	30.5	...	9.8	...	18.5	...	6.8	.80	14.5	...	16.4	...	64.0	...	20.7	...
22		IV. Poisons	2.7	.34	2.0	...	4.1	.25	6.2	...	2.3	...	5.4	.55	6.6	.79	3.7	.46	5.9	.88	2.6	...	3.0	...	7.2	...	2.1	...
23		V. Injuries.	98.1	.68	77.2	1.97	80.6	.51	98.7	.78	67.9	57	108.6	1.63	110.3	1.06	78.8	.46	94.0	1.18	100.9	.32	82.9	...	84.1	2.16	100.2	2.07
24		Accidental	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25		Homicidal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
26		Self-inflicted	1.03	...	.7	.56	.5	.76	...	...	...	1.14	.5	...	...	.26	...	.69	.6	.30	...	.65	...	.42	...	.72	...	.69
27		VI.																										
28		Surgical Operations	3	...	...	...	.5	.25	...	...	1.1	...	...	...	1.1	...	.2	...	1.5	...	.3	...	.4	...	1.4	...	.7	...
29		No appreciable disease	...	...	...	...	.8	...	...	...	1.1	...	...	...	1.3	...	.2	...	.6	...	1.9	...	...	...	...	...	...	...
30		Total	1823.6	18.90	1629.0	22.96	1004.3	15.71	1700.9	19.43	1268.0	15.4	2278.6	16.97	1798.0	24.92	1081.1	11.55	1230.9	17.14	1581.3	14.61	2501.0	24.40	1893.6	23.48	1232.2	9.66

GENERAL DISEASES.

Stations	Presidency.	Allahabad.	Oude.	Saugor.	Bohlicund.	Gwalior.	Meerut.	Sirhind.	Lahore.	Rawul Pindies.	Peshawur.	On the March.	Depoza.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Eruplive Fevers	1	...	3	...	2	1

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Ratio per 1,000 of Mean Strength.

Stations	Presidency		Allahabad.		Oode.		Saugor.		Bohlood.		Gwalior.		Meerut.		Sirhind.		Lahore.		Bavul Pindie.		Peshawur.		On the March.		Depota.	
				Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
General Diseases.																													
Febrile—																													
Eruptive Fevers	...	...	...	3	...	...	...	8	...	1.6	.78	...	...	...	...	8	.26	1.3	...	9	...	1.3	...	1.7	...	4.8	...	2.1	...
Continued	...	...	...	173.3	2.05	145.4	1.97	80.3	2.79	86.2	.78	55.4	.57	35.9	.64	219.0	4.24	97.1	1.16	151.3	.59	120.3	2.26	366.8	4.63	55.3	.69	56.1	...
Paroxysmal	...	...	...	189.0	.34	338.7	1.31	127.8	1.27	794.1	3.88	233.1	...	1424.9	8.27	444.3	4.24	228.2	.69	250.1	1.48	631.4	1.29	1242.4	6.31	337.3	1.38	524.1	2.88
Malignant Cholera	...	...	...	1.0	.34	6.2	4.92	4.8	2.00	...	...	...	...	.5	.64	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Influenza	...	...	...	3	...	3.6	...	2	...	8	...	...	...	.5	...	2.4	.24	.7	...	.6	...	1.6	...	...	...	.7	...	7.2	...
Erysipelas	...	...	...	2.1	.34	1.6	...	.5	...	...	...	2.8	...	2.2	...	2.9	.26	6.2	...	.6	...	2.9	...	3.3	.42	4.1	...	12.9	...
Other Diseases of this Group	...	...	...	3	...	.3	...	...	...	...	...	...	...	.5	...	.3	.26	.5	...	...	...	.3	...	...	...	...	...	...	...
Constitutional—																													
Rheumatism	...	...	...	36.9	...	47.0	...	45.6	...	56.0	...	68.5	...	61.5	...	59.3	.26	68.3	...	51.4	...	64.2	...	45.9	...	60.8	...	97.8	...
Syphilis	...	...	...	118.3	...	165.8	...	122.2	...	80.0	...	109.0	...	96.2	...	88.0	...	60.9	...	82.8	.30	85.1	.22	85.8	...	104.4	...	168.9	...
Scrofula, Phtisis, &c.	...	...	...	14.2	1.37	5.9	.66	5.6	1.52	12.4	2.33	7.4	.57	4.4	.54	11.7	.80	6.5	1.62	12.4	2.36	2.9	1.94	9.2	2.95	6.9	...	22.3	7.19
Scurvy and Purpura	...	...	...	3	...	.3	...	...	...	8	...	1.1	...	.5	...	8	...	...	...	...	...	.6	...	.4	...	...	...	.7	...
Anemia	...	...	...	1.0	...	5.3	...	8.4	...	11.7	...	4.6	...	4.4	...	11.7	...	4.9	...	3.3	...	5.8	...	6.3	...	9.7	...	23.0	...
Other Diseases of this Group	...	...	...	2.4	...	1.6	...	.5	.25	2.3	.78	.6	...	.5	...	.8	.26	.2	.23	.6	...	1.0	.32	1.3	...	3.4	...	5.0	.72

GENERAL DISEASES were more prevalent than in 1870 in the Presidency, Allahabad, Rohilcund, and Gwalior Divisions, the increase being greatest in the latter; there was a decrease in all the other Divisions, but most marked in the Peshawur, where it amounted to upwards of 1,300 per 1,000. There was an increase in the mortality in the Allahabad, Rohilcund, Meerut, Sirhind, and Peshawur Divisions, and at the Depôts, and a decrease in all the other Divisions, but in none was the ratio excessive.

Eruptive Fevers did not prevail among the troops to any extent at any of the stations. There were only 11 cases of small-pox, and one death; the latter occurred in the 4th Hussars at Meerut in a man bearing distinct marks of previous vaccination.

Continued Fevers were more prevalent than in 1870 in the Presidency, Allahabad, Rohilcund, Meerut, and Sirhind, and less prevalent in all the other Divisions. The increase was most marked in the Meerut Division, and was due to the prevalence of simple continued fever in the Royal Artillery and the 65th Regiment; the 4th Hussars were comparatively exempt from it. No special cause was assigned for its prevalence, except in the 65th Regiment, in which it was attributed to the recent arrival of the corps from England. In the Presidency the excess was chiefly in the 2nd Battalion 19th Regiment at Calcutta, and also to some extent in the 63rd Regiment at Hazareebaugh, and which had arrived from England in the end of 1870. In the Allahabad Division, the 1st Battalion 14th Regiment, at Cawnpore, furnished the greatest number of cases; and in the Sirhind Division the excess occurred in the 72nd at Umballa, a regiment which arrived in India early in March.

The enteric type has contributed largely to the mortality by continued fevers, having been returned as the cause of death in 48 out of the 68 fatal cases under this group. This form of fever has apparently increased much in frequency and mortality during the last four years, but it may be a question whether this is not rather a result of a more careful study and diagnosis than of any actual increase of the disease in this Command. The following Table shows the annual admissions and deaths by this form of fever in the Bengal Command during the last 10 years:—

Year.	Enteric Fever.		Year.	Enteric Fever.	
	Admissions.	Deaths.		Admissions.	Deaths.
1862 ..	10	6	1867 ..	16	8
1863 ..	20	13	1868 ..	70	40
1864 ..	9	5	1869 ..	61	27
1865 ..	13	8	1870 ..	89	38
1866 ..	14	9	1871 ..	131	48

It will be seen from this Table that there has been a marked increase in the admissions and deaths, commencing in 1868, and that they were much higher in 1871 than in any previous year. The stations at which enteric fever was most prevalent and fatal during the year under review were Peshawur, and Cheratt, Hazareebaugh, Lucknow, Meerut, Agra, Allahabad, Shahjehanpore, and Umballa. The corps which furnished the highest number of cases and deaths were the 63rd Regiment at Hazareebaugh, which had 18 admissions and four deaths, and the 1st Battalion 17th Regiment, at Lucknow, which had 13, with six deaths. The Returns do not show the ages of the men attacked, but the mortality fell most heavily upon the young soldiers, and the natural inference is that this was the result of their greater proclivity to the disease which, however, is not peculiar to India, but may be stated to be the rule wherever enteric fever prevails. The following Table shows the ratio of mortality at each age, those regiments only being included in which fatal cases of the disease occurred:—

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	Under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and upwards.
Ratio of deaths } per 1,000 of strength .. }	6.58	4.21	3.32	.32	.95	..

The mortality under 30 averaged 4.27 per 1,000 of the strength, while above 30 it only amounted to .46 per 1,000.

Considerable importance has been attached to the question whether enteric fever is a disease which specially attacks regiments newly arrived in the country. The fatal cases in 1871 were distributed as follows :—

				Ratio of Deaths by Enteric Fever per 1,000 of Mean Annual Strength in 1871.
In 1st year of service	..	3 Regiments	.. ..	4.22
2nd " "	..	2 "	.. ..	3.79
3rd " "	..	None.		..
4th " "	..	2 Regiments	.. ..	4.84
5th " "	..	3 "	.. ..	1.31
6th " "	..	2 "	.. ..	1.16
7th " "	..	2 Batts. R.A. and 1 Regt.		2.64
8th " "	..	1 Batt. " 2 Regts.		2.29
Beyond 8th year of service ..		6 Batts. " 2 "		4.05

The numbers are too limited to justify any positive deductions from them and there is, moreover, a difficulty arising from drafts from England joining the regiments in their later years of service, but these results show, at least, the necessity for more extended enquiry, and for caution in accepting the assertion that the disease is most prevalent in newly arrived corps.

Paroxysmal Fevers were more prevalent than in 1870 in the Presidency, Allahabad, Rohilcund, and Gwalior, and less in all the other divisions; the increase was most marked in the Gwalior Division, amounting to 358 per 1,000 of the strength, and occurred chiefly in the 1st Battalion 11th Regiment at Morar Gwalior, and in the 106th Regiment at Jhansi and Fortress Gwalior; the admissions by paroxysmal fevers in the former of these corps were in the ratio of 1,554, and in the latter of 1,487, per 1,000 of mean strength. The reduction was greatest in the Peshawur Division, being equal to the average strength; it was also very marked in the Lahore Division, where it amounted to 609 per 1,000; in the Saugor, to 350; and in the Rawul Pindee Division to 286 per 1,000 of mean strength. Notwithstanding this great reduction in the Peshawur Division, the admissions still amounted to 1,242 per 1,000 of the strength, and were higher than in any, except the Gwalior Division. The great prevalence of these fevers in the Division occurred in the 1st Battalion 5th Regiment at Nowshera, which, in an average strength of 535 men at the station, had 1,283 cases, or in the ratio of 2,398 per 1,000; in the 2nd Battalion 60th Regiment at Peshawur the admissions by these fevers exactly amounted to the average strength; in the Artillery at that station they were in the ratio of 1,171 per 1,000; in the 38th Regiment, during the first quarter of the year, there were 425 cases in a strength of 742, or in the *annual* ratio of 2,285 per 1,000; in the 1st Battalion 6th Regiment, which relieved the 38th, the admissions at Peshawur during the last three quarters of the year were only in the annual ratio of 304 per 1,000. In the end of June, large detachments, amounting to about 850, were sent from Peshawur to Cheratt, and remained there till November, and although the most sickly men were selected for the change, the admissions by paroxysmal fevers among them were only in the *annual* ratio of 399 per 1,000 of mean strength. The admissions were high also in the

Saugor Division, being nearly equal in amount to four-fifths of the strength. This heavy proportion of sickness was chiefly due to the prevalence of Ague in the 1st Battalion 19th Regiment at Saugor and Nowgong, in a detachment of the 106th Regiment at Nowgong, and in the E Battery 8th Brigade Royal Artillery, during the last quarter of the year at Saugor.

Cholera did not prevail to any extent, except in the Allahabad and Oude Districts, in the former of which 19 cases and 15 deaths, and in the latter 19 cases and 8 deaths occurred. The regiments which suffered most were the 1st Battalion 17th, the 96th, and 104th Regiments. The 104th at Allahabad had 7 cases, all of which proved fatal; 2 occurred in March, 3 in April, one in May, and one in June; the 96th, at Dinapore, had 7 cases and 5 deaths in November; the 1st Battalion 17th, at Lucknow, had 17 cases with 6 deaths, also in November, and the C Battery 8th Brigade Royal Artillery and the 62nd had each a fatal case in the same month at that station. Three fatal cases occurred at Benares, one in the A Battery F Brigade Royal Artillery in July, and 2 in the 1st Battalion 3rd Regiment in August. The other 2 fatal cases in the Command occurred one in the 107th Regiment at Dum Dum in December, and the other in the 106th at Jhansi in September.

Erysipelas gave rise to an unusual number of admissions in the Sirhind Division, but the cases occurred chiefly in one regiment—the 85th, at Dugshai—in which 18 out of the 27 admissions took place. No special cause of the disease could be traced; the head and face were the parts affected in all the cases, and all recovered.

Rheumatism was considerably more prevalent than in 1870 in the Rohilcund Division; there was a slight increase also in the Saugor, Gwalior, Sirhind, and Rawul Pindee Divisions, and a decrease in all the others. The excess in the Rohilcund Division was chiefly in the 2nd Battalion 1st Regiment at Shahjehanpore and Raneekhet; in the Sirhind Division, which, with the Rohilcund, had the highest proportion of cases, it occurred in the 85th Regiment at Dugshai.

Syphilis shows an increase of 21 per 1,000 in the Rawul Pindee and Peshawur Divisions, but the ratio of admissions is still lower in them than in any, except the Sirhind and Saugor Divisions. There was a slight increase in the Presidency and Allahabad Divisions. As in the preceding year the highest ratio of cases was furnished by the Allahabad, and the lowest by the Sirhind Division. The great prevalence in the Allahabad Division was chiefly in the Artillery and 104th Regiment at Allahabad, the Artillery and 1st Battalion 14th Regiment at Cawnpore, and the 96th Regiment at Dinapore. In the Presidency Division the excess occurred in the 63rd Regiment at Hazareebaugh, and in the Oude Division in the 1st Battalion 17th, and the 62nd Regiment at Lucknow, and the 26th Regiment at Fyzabad.

Scrofula, Phthisis, &c.—These diseases were less prevalent than in 1870 in all the Divisions except the Presidency and Lahore, which had a moderate increase, and Rohilcund, where the ratio was identical in the two years. The ratio of mortality was a little higher in the Presidency, Oude, Rohilcund, Sirhind, Lahore, and Peshawur, but the excess was not above the fluctuations common when the numbers under observation are limited.

Anæmia.—The admissions under this head were unimportant, and in most of the Divisions were under the proportion of the preceding year. The ratio was highest in Saugor and Meerut, and in these scarcely exceeded one per cent. of the strength.

LOCAL DISEASES.—There was an increase in the prevalence of diseases of the nervous system in the Presidency, Saugor, Rohilcund, Meerut, and Rawul Pindee Divisions, most marked in the Rohilcund and Saugor; in the other Divisions there was a decrease, greatest in the Gwalior, but also well marked in the Lahore and Peshawur Divisions. Neuralgia, probably of malarious origin, has been much the most frequent cause of admission in this class.

Diseases of the Eyes were slightly more prevalent than in 1870 in the Presidency, Saugor, Rohilcund, and Lahore Divisions; in the Oude, Gwalior, and Rawul Pindee Divisions there was a marked reduction, and in the others the results of the two years did not differ materially. The highest ratio of admissions was in the Allahabad Division; the excess occurred chiefly in the

Bengal. 96th Regiment at Dinapore, and, though to a less extent, in the 1st Battalion 14th Regiment at Cawnpore.

Diseases of the Circulatory System were much less prevalent than in 1870 in the Peshawur Division, and there was a reduction also in the Oude, Saugor, and Rawal Pindee Divisions. In all the others there was an increase, most marked in the Presidency, Rohilcund, and Lahore Divisions, in the latter the excess was due to the occurrence of a number of cases of palpitation in the 37th Regiment. The Rohilcund, Gwalior, and Lahore Divisions, were those in which the ratio of admissions was highest, and the Rohilcund, Gwalior, and Peshawur those in which the mortality was in excess. Palpitation was the most prevalent disease, and aneurism of the aorta and valve disease of the heart were the chief causes of mortality.

Diseases of the Respiratory System.—There was a considerable decrease in the prevalence of these diseases in the Saugor, Sirhind, and Peshawur Divisions, but especially in the last of these, and there is a very marked increase in the Rohilcund, Gwalior, and Meerut Divisions. In Rohilcund this was the result principally of the prevalence of brouchitis in the 2nd Battalion 1st Regiment at Shahjehanpore and Raneekhet; in Gwalior, from bronchitis in the 1st Battalion 11th Regiment at Morar and the 106th Regiment at Jhansi; and in the Meerut Division, from the same disease in the 4th Hussars at Meerut. Although there has been a very great decrease in the Peshawur Division, amounting to 58 per 1,000 of mean strength, it still shows the highest ratio of admissions by this class of diseases. The excess occurred chiefly, as in 1870, in the 38th Regiment at Peshawur, and the 1st Battalion 5th Regiment at Nowshera.

Diseases of the Digestive System.—There was a considerable increase in the prevalence of these diseases in the Rohilcund, Meerut, and Presidency Divisions, and a trifling one in the Peshawur and Sirhind. In all the others there was a decrease, very marked in the Allahabad, and considerable in the Oude, Saugor, and Lahore Divisions. The Presidency was the only Division in which the ratio of mortality by this class was higher than in 1870; in all the other Divisions there was a reduction, but particularly in Oude, Gwalior, and Peshawur, amounting in them to between 4 and 5 per 1,000. The highest ratio of admissions was in the Meerut, and the lowest in the Oude; the highest of deaths was in the Presidency, and the lowest in the Peshawur Divisions.

The following Table shows the ratio of admissions and deaths per 1,000 of mean strength in each of the Military Divisions, by dysentery, diarrhoea, and hepatitis:—

Divisions or Districts.	Ratio per 1,000 of Mean Strength.		Divisions or Districts.	Ratio per 1,000 of Mean Strength.	
	Admitted.	Died.		Admitted.	Died.
Presidency ..	177·7	7·52	Meerut	213·7	5·83
Allahabad ..	203·9	7·22	Sirhind	110·0	2·32
Oude	118·1	3·30	Lahore	183·3	2·66
Saugor	103·3	5·44	Peshawur ..	184·7	1·68
Rohilcund ..	194·6	5·14	Rawul Pindee..	130·0	1·94
Gwalior	120·8	3·81			

On comparing these with the corresponding results for 1870, there appears to have been an increase in the prevalence of these diseases in the Presidency, Rohilcund, Meerut, Peshawur, and Sirhind Divisions, and in the mortality in the Presidency Division. In all the other divisions there was a decrease, that of the admissions was greatest in the Oude, and of the deaths in the Rawul Pindee Division. The mortality by these three diseases is still very high in some of the Divisions, particularly the Presidency and Allahabad.

Diseases of the Urinary System.—There was a considerable increase in the prevalence of these in the Meerut and Saugor, and a trifling increase in the

Presidency, Sirhind, and Peshawur Divisions. In all the others there was a decrease, most marked in Gwalior and Oude. The difference occurred chiefly in cases of gonorrhoea. The Peshawur Division furnished the lowest, and the Allahabad the highest ratio of admissions.

Diseases of the Cutaneous System were very prevalent in the Meerut Division. The excess was chiefly in ulcers and boils, and the corps which furnished the greatest proportion of cases were the 4th Hussars at Meerut, and the 11th at Muttra, the 65th Regiment at Agra, and the 109th at Delhi and Roorkee.

Poisons.—The admissions under this head were nearly all cases of delirium tremens; the Meerut, Saugor, and Lahore Divisions furnished the highest proportion of cases. The deaths from delirium tremens amounted altogether to 7, and there were 3 by alcoholic poisoning. In addition to these there was one admission and death from poisoning by opium in the Artillery at Seetapore, an admission from poisoning by castor oil seeds in the Artillery at Allahabad, and one by poisonous fungi in the 107th Regiment at Dum Dum.

The admissions and deaths in each corps serving in the command during the year 1871 were as follows:—

Regiments.	Average Strength for the Year.	Admitted into Hospital.	Deaths.			Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
CAVALRY.								
								Months.
4th Hussars ..	445	702	4	2	6	1577·5	13·48	Meerut 12
5th Lancers ..	450	388	6	..	6	862·2	13·33	Sealkote 12
11th Hussars ..	441	570	7	..	7	1292·5	15·87	Muttra 12
20th „ ..	443	583	6	1	7	1316·0	15·80	Umballa 12
21st „ ..	405	544	7	1	8	1343·2	19·75	Lucknow 12
Total Cavalry..	2,184	2,787	30	4	34	1276·1	15·57	
ROYAL ARTILLERY.								
								Batt.: Months.
A Brigade R.H.A.	741	1,745	17	3	20	2354·9	26·99	A, Peshawur 12
								B, Rawul Pindee 12
								C, Meerut 10
								„ On the march 2
								D, Peshawur 3
F Brigade R.H.A.	795	1,319	10	..	10	1659·1	12·58	„ Cambellpore 9
								E, Sealkote 12
								A, Benares 12
								B, Morar 12
								C, Lucknow 12
8th Brigade R.A.	963	1,479	24	..	24	1535·8	24·92	D, Meerut 6
								E, Umballa 11
								„ On the march 1
								F, Meean Meer 10
								„ On the march 2
								B, Dinapore 12
								C, Lucknow 12
								D, On the march 3
								„ Jubbulpore 9
								E, Saugor 12
								F, On the march 1½
								„ Barrackpore 10½
								G, Jullundur 12
								H, Meean Meer 12

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Regiments.	Average Strength for the Year.	Admitted into Hospital.	Deaths.			Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
RL. ARTILLERY, <i>continued.</i>								Batt. : Months.
								A, On the march 1½
								„ Seetapore 10½
								B, Barrackpore 12
								C, Morar 12
								D, Allahabad 10
								„ Meerut 2
16th Brigade R.A.	920	1,467	24	8	32	1594·6	34·78	E, On the march 1½
								„ Fyzabad 10½
								F, Meerut 11½
								„ On the march ½
								G, Bareilly 6
								A, Cawnpore 12
								B, On the march ½
								„ Ferozepore 11½
								C, Mooltan 12
								D, Meerut 11½
19th „ „	965	1,876	15	3	18	1944·0	18·65	„ On the march ½
								E, Rawul Pindee 9½
								„ On the march 2½
								F, Agra 11
								„ On the march 1
								G, Nowgong 12
								A, Jutogh 10
								„ On the march 1
								B, Peshawur 6
								2, Khyra Gully 10½
								„ Rawul Pindee 1½
								3, Calcutta 10
22nd „ „	508	624	6	1	7	1228·3	13·71	„ On the march ½
								4, Meean Meer 10
								„ On the march ½
								5, Ferozepore 10½
								„ On the march ½
								6, Saugor 10
								„ On the march ½
								7, Agra 10½
23rd „ „	142	300	4	..	4	2112·7	28·17	E, Bareilly 6
								F, Nowgong 6
								1, Delhi 10
								„ On the march ½
								„ Morar 1½
								2, Fort Gwalior 12
								3, Lucknow 9½
								„ On the march 1
24th „ „	525	643	12	1	13	1205·8	24·76	„ Peshawur 1½
								4, Darjeeling 12
								5, Meean Meer 10
								„ Ft. Govindghur 1
								„ Agra 1
								6, Attock 1
								7, Allahabad 6

Regiments.	Average Strength for the Year.	Admitted into Hospital.	Deaths.			Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
RL. ARTILLERY— <i>continued.</i>								Batt. : Months.
25th Brigade R.A.	254	323	2	..	2	1271.7	7.87	1, Allahabad 6 2, Mooltan 10 3, Morar 10 4, Peshawur 10 5, Rawul Pindee 3½ „ Khyra Gully 2½
C & D Brigade R.H.A.	219	388	4	..	4	..	..	These Brigades only served in Bengal during a very short part of the year.
5, 13, & 20 Brigades R.A.								
Total Artillery.	6,032	10,164	118	16	134	1685.1	22.22	
INFANTRY.								Months.
2nd Bn. 1st Foot	909	1,882	19	..	19	2070.4	20.90	{ Shajehanpore, with Wing at Rancee Khet } 12
1st „ 3rd „	880	857	19	..	19	973.9	21.59	{ Seetapore, with Wing at Benares } 12
1st „ 5th „	892	2,566	29	..	29	2876.7	32.51	{ Nowshera } 10½
1st „ 6th „	859	1,410	16	..	16	1641.4	18.63	{ On the march } 1½
1st „ 11th „	848	2,068	11	1	12	2138.7	14.15	{ Rawul Pindee } 3
2nd „ 12th „	840	768	10	1	11	914.3	18.10	{ Cheratt } 4½
1st „ 14th „	808	1,831	10	2	12	2266.1	14.85	{ Peshawur } 4½
1st „ 17th „	921	1,018	21	..	21	1105.3	22.80	{ Morar, with Detachment at Fort Gwalior } 12
1st „ 19th „	655	1,009	11	1	12	1540.5	18.32	{ Jubbulpore } 1
2nd „ 19th „	859	952	15	1	16	1108.3	18.63	{ On the march } ½
2nd „ 25th „	951	689	9	1	10	724.5	10.52	{ Subathoo } 10½
26th Foot ..	848	739	9	1	10	871.5	11.79	{ Cawnpore } 10
36th „ ..	738	989	10	..	10	1340.1	13.55	{ Calcutta, with Wing at Cawnpore } 2
37th „ ..	843	1,160	16	2	18	1376.0	21.35	{ Lucknow } 12
38th „ ..	721	1,675	5	..	5	2323.2	6.93	{ Saugor } 10
39th „ ..	926	1,030	9	1	10	1112.3	10.80	{ Calcutta } 10
41st „ ..	832	851	16	2	18	964.9	20.41	{ Allahabad } 2
55th „ ..	870	590	8	..	8	678.2	9.20	{ Bareilly } 10
58th „ ..	742	892	10	1	11	1202.2	14.82	{ On the march } ½
								{ Saugor } 1½
								{ Fyzabad } 12
								{ Rawul Pindee } 12
								{ Meen Meer } 12
								{ Peshawur } 3
								{ Rawul Pindee } 9
								{ Ferozepore } 12
								{ Mooltan } 12
								{ Chuckratta } 10½
								{ Sealkote, with Detach. at D. Lhousie } 12

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Regiments.	Average Strength for the Year.	Admitted into Hospital.	Deaths.			Ratio per 1,000.		Stations during the Year.	
			In India.	Of India.	Total.	Admitted.	Died.		
INFANTRY—cont.									
								Months.	
2nd Bn. 60th Rifles	990	1,739	22	..	22	1740·7	22·02	Peshawur	12
62nd Foot	840	774	9	..	9	921·4	10·71	Lucknow	12
63rd "	922	1,273	16	..	16	1380·7	17·35	Hazareebaugh	12
65th "	767	980	23	..	23	1277·7	29·99	{ Agra	10
70th "	149	196	4	..	4	1315·4	26·85	{ On the march	↓
72nd "	680	787	10	..	10	1157·4	14·71	{ Rawul Pindee	↓
85th "	921	1,153	9	1	10	1295·3	10·86	{ Umballa	8½
92nd "	871	1,015	14	..	14	1165·3	16·07	{ On the march	↓
96th "	872	1,020	18	2	20	1169·7	22·93	{ Dugshai	12
104th "	600	1,032	16	..	16	1720·0	26·27	{ Jullundur	10½
106th "	776	1,627	25	2	27	2096·6	34·79	{ On the march	↓
106th "	835	2,063	22	2	24	2331·1	27·12	{ Dinapore, with	↓
107th "	931	1,139	23	4	27	1223·4	29·00	{ Detach. at	↓
109th "	861	1,596	12	2	14	1853·7	16·26	{ Chunar	↓
54th, 79th, & 103rd	174	207	5	1	6	..	..	{ Allahabad	10
								{ Meerut	11½
								{ On the march	↓
								{ Jhansi	12
								{ Dum-Dum	12
								{ Roorkee and Delhi	11½
								{ On the march	↓
								{ These Corps only	↓
								{ served a small part	↓
								{ of the year in Bengal.	↓
Total Infantry.	27,240	39,577	481	28	509	1452·6	18·69		

As in the preceding year, the admissions and deaths were highest in the Artillery and lowest in the Cavalry.

In the Cavalry the highest ratio of admissions occurred in the 4th Hussars at Meerut, and of deaths in the 21st at Lucknow, while the lowest ratio, both of admissions and of deaths, was in the 5th Lancers at Sealkote.

In the Artillery the ratio of admissions was highest in the A Brigade Royal Horse Artillery, particularly in the D Battery at Peshawur and subsequently Campbellpore, the A Battery at Peshawur, the B Battery at Rawul Pindee, and the C at Meerut. The ratio was lowest in the 24th Brigade Royal Artillery, the exemption from disease being most marked in the 2nd Battery, at Fortress Gwalior, the 3rd at Lucknow, the 4th at Darjeeling, and the 5th at Meean Meer. The mortality was highest in the 16th, and lowest in the 25th Brigade.

In the Infantry the 1st Battalion 5th Regiment at Nowshera and Attock had the highest, and the 55th Regiment at Chuckratta the lowest ratio of admissions; the mortality was greatest in the 105th Regiment at Meerut, and least in the 38th Regiment at Rawul Pindee.

SANITARY REPORT.

Surgeon-General Beatson, C.B., makes the following remarks:—

The health of the troops seems to have been very satisfactory, on the whole, during 1871.

Having so lately returned to India in relief of Inspector-General Dr. Muir, I cannot speak very fully from my own observation, but this is of less consequence, as Dr. Muir entered fully into all matters requiring notice in his report for 1870.

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I may, however, mention one great requirement which has been met within the last few months, by the obtaining of a most suitable building—suitable in position as well as in the extent and nature of the accommodation—as a hospital for the sick of the British force in Fort William, Calcutta.

This was an urgent requirement, as the building which has been occupied for many years is as faulty in construction and in condition as can well be imagined. That which has now been given over is in every way the reverse, and will make an admirable hospital, with ample room for all the ordinary requirements of the force now in Fort William.

While on the subject of hospitals, I may allude to their equipment. When last in India, this subject of hospital clothing and equipment constantly engaged my attention, and I was led to urge that, in this matter of bedding and clothing, the hospitals of Her Majesty's British regiments in India should be as well supplied as those in England, and in all Crown Colonies.

In 1867, the year before I left India, a new and much improved scale of clothing and equipment was sanctioned, and steps are now being taken to ensure its early adoption by the gradual introduction of the better articles as new ones are required.

I may also mention that I have noticed since my return to India an improvement, which I had repeatedly recommended, in barrack bedding, viz., the general introduction of board and iron trestle beds, with a good mattress for each.

It may be attended with some difficulty to make a complete change in the system of supplying the soldier's bedding which has so long obtained in this country; but the system which makes the bedding the property of the individual soldier is an inconvenient and imperfect one, compared with that which supplies him, for the occasion, with sufficient covering to protect him in camp, and when moving from place to place. The Indian system is attended with this great additional defect, viz., that the amount of bedding, which is sufficient for the warmer parts of India, is quite inadequate for the hills or in the Punjab during the winter. If the present system is to be continued, it should be recognized as an established arrangement that in the localities I have mentioned, extra bedding should be available for issue when required.

I believe one important sanitary requirement is at present engaging the attention of the Government of India, viz., the improvement of the condition of the water supply at Peshawur.

There has been little change during the year in respect of the space, ventilation, &c., in barracks; the space, 90 superficial feet in barracks, and 120 in hospitals in the plains, is a very liberal one, while the ventilation, means of ablution, &c., are all that can be desired.

As regards drainage, much has yet to be done at several stations in improving the surface and subsoil drainage.

II.—MADRAS.

STATISTICAL REPORT.

The average strength of the European troops in the Madras Command in 1871 was 10,684 men, among whom there occurred 12,944 admissions into hospital and 230 deaths, being in the ratio of 1,211 and 21.53 per 1,000 of mean strength. Of the deaths, 13 were among the invalids on their passage to England and at Netley. The admissions were 70, and the deaths 2.12 per 1,000 under the ratio of the preceding year.

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The admissions and deaths by the different classes of diseases are shown in the following Table, framed from Abstract No. 18 in the Appendix :—

Orders.	Diseases.	Strength, 10,684.				Ratio per 1,000 of Mean Strength.			
						1871.		1869-70.	
		Admitted.	Deaths.			Admitted.	Died.	Admitted.	Died.
			In the Command.	Of Invalids.	Total.				
	I. General Diseases.								
1	Febrile Group ..	1,960	68	..	68	183.4	5.90	232.4	5.34
2	Constitutional „ ..	1,680	14	5	19	157.2	1.78	177.6	2.08
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	232	15	..	15	21.7	1.40	23.0	3.02
2	Eye	202	..	..	..	18.9	..	25.4	..
3	Ear	114	..	..	..	10.7	..	6.8	..
4	Nose	6	..	..	..	.6	..	.4	..
5	Circulatory System ..	206	23	1	24	19.3	2.25	12.7	2.08
6	Absorbent „ ..	281	..	..	..	26.3	..	22.9	..
8	Respiratory „ ..	462	6	..	6	43.2	.56	44.1	.69
9	Digestive „ ..	3,611	66	6	72	338.0	6.73	350.8	8.90
10	Urinary „ ..	937	..	..	..	87.7	..	90.0	.10
11	Generative „ ..	192	..	..	..	18.0	..	17.1	..
12	Organs of Locomotion	65	1	1	2	6.1	.19	5.7	..
13	Cellular Tissue ..	171	..	..	..	16.0	..	16.5	..
14	Cutaneous System ..	968	..	..	..	90.6	..	99.2	..
	III. Conditions, &c.								
	Debility ..	512	..	..	..	47.9	..	42.2	.20
	IV. Poisons ..	99	6	..	6	9.3	.56	18.6	.79
	V. Injuries.								
2	Accidental	1,228	12	..	12	114.9	1.12	118.3	1.24
3	Homicidal .. ..	..	..	..	..	..	..	..	.10
4	Self-inflicted ..	2	9	..	9	.2	.84	.2	.54
	VI. Surgical Operations	2	..	..	..	.2	..	.1	..
	No appreciable disease	14	..	..	..	1.8	..	1.1	..
	Total	12,944	215	18	238	1211.5	21.35	1305.1	25.08
	Average of 10 years, } 1861-70 }	..	..	..	..	1871.0	22.62	..	..

GENERAL DISEASES.—Compared with the results for the preceding year, there was a marked decrease in the prevalence and a slight increase in the mortality of this class. The decrease was very marked in the febrile group, and in it also the increase of mortality occurred. The following Table shows the influence of the principal diseases of this class on the sickness and mortality :—

General Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers	12	..	1·1	..	·7	·15
Continued „	781	19	68·4	1·78	82·4	1·23
Paroxysmal „	1,090	7	102·0	·66	139·4	·79
Malignant Cholera	76	36	7·1	3·37	5·4	3·12
Influenza	17	..	1·6	..	2·2	..
Erysipelas	20	1	1·9	·09	1·7	..
Other Diseases of this group	14	..	1·3	..	·4	·05
<i>Constitutional—</i>						
Rheumatism	452	1	42·3	·09	47·3	..
Syphilis	1,001	1	93·7	·09	107·3	·25
Scrofula, Phthisis, &c. ..	152	16	14·2	1·49	13·9	1·48
Scurvy and Purpura	3	..	·3	..	1·0	·05
Anæmia	66	..	6·2	..	7·1	..
Other Diseases of this group	6	1	·5	·09	1·0	·30

Eruptive Fevers were more prevalent than in 1870, but did not prevail epidemically among the troops in any corps or at any station, and none of the cases proved fatal.

Continued and Paroxysmal Fevers were considerably less prevalent, particularly the latter, but gave rise to a slightly higher ratio of mortality. Of the 19 deaths by continued fevers, 15 were returned under the head of enteric.

Cholera was more prevalent, but to a slight extent less fatal, than in 1870. It was however almost entirely confined to one corps, the 18th Hussars, at Secunderabad, in which all but 5 cases and 3 deaths occurred.

Syphilis continues to show a reduction in its prevalence. There was a slight increase in the prevalence and mortality of *scrofula and phthisis*, but the difference did not exceed the fluctuations which may be naturally looked for when the number of cases is so limited.

LOCAL DISEASES have not varied materially from the results of the preceding year, except that there was a marked reduction in the admissions for ophthalmia, an increase in those for inflammation of the ear, in the diseases of the circulatory system—chiefly palpitation of the heart—and in those of the urinary system confined almost exclusively to gonorrhœa. The reduction in the mortality was principally in diseases of the nervous and digestive systems.

INJURIES.—The deaths under this class were almost identical with the results of the preceding year, but there was a decrease in the proportion of accidental, counterbalanced by an increase in self-inflicted injuries.

The following Table shows the amount of sickness and mortality at each of the principal military stations in the Command :—

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Stations.	Average Annual Strength.	Admitted into Hospital.	Died in India.	Ratio per 1,000 of Strength.			
				Admitted.	Died.	Average of previous Periods	
						Admitted.	Died.
Presidency Circle.	Fort St. George and Palaveram	770	822	14	1,068	18·18	1555·6 1459·3
	St. Thomas's Mount	387	391	8	1,010	20·67	
	Trichinopoly ..	284	312	5	1,099	17·61	
Mysore Circle.	Bangalore ..	1,574	1,940	16	1,233	10·16	1042·9
	Cannanore*	999	1,142	22	1,143	22·02	1111·6
	Bellary ..	844	761	7	902	8·29	1432·5
Hydrabad Circle.	Secunderabad ..	2,131	2,767	86	1,298	40·36	1485·5
	Kamptee†	978	1,405	9	1,436	9·20	1664·3
Birmah Circle.	Rangoon ..	805	916	11	1,138	13·66	1322·3
	Thayetmyo ..	539	784	8	1,460	14·84	1425·3
	Tonghoo ..	378	413	3	1,185	7·94	1246·8
	Port Blair ..	110	119	2	1,082	18·18	1320·0
Depôts	Poonamallee ..	144	445	7	3,090	48·61	2683·5
	Ramandroog ..	55	40	0	727	..	1763·3
	Wellington ..	339	421	4	1,242	11·80	1214·1
Troops on the March ..	..	342	230	13	673	38·01	..

* Including detachments at Calicut and Malleapooram.

† Including detachments at Seetabuldee and Chindwarrah.

Compared with the results of the preceding year, there was an increase in both admissions and deaths at Bangalore, Cannanore, Secunderabad, Port Blair, and Poonamallee; in the admissions also at Fort St. George and Palaveram, Tonghoo, and among troops on the march; and in the deaths only, at Bellary, Rangoon, and Wellington; omitting the depôts, the sickness was greatest at Thayetmyo, and the mortality at Secunderabad, the latter chiefly from the prevalence of cholera as an epidemic in May and June. The lowest ratio of sickness was at Bellary, and of deaths at Tonghoo; but the ratio of mortality was very low also at Bellary and Kamptee, not exceeding at them the average of that of troops serving at home.

The following Table shows the influence of the different classes of diseases in causing sickness and mortality in each of the Circles:--

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Orders.		Stations	{	Presidency Circle.		Mysore' Circle.	Hydrabad. Circle.	Birmah Circle.	Depöta.	On the March.	Presidency Circle.		Mysore' Circle.	Hydrabad Circle.	Birmah Circle.	Depöta.	On the March.											
					Admitted.	Died.						Admitted.	Died.																
Strength		...	...	...	1,441	3,417	3,109	1,832	633	342	Annual Ratio per 1,000 of Strength.																	
		Diseases.																											
		I. General Diseases.																											
1	1	Febrile Group ...	...	...	162	1	479	12	840	41	384	6	82	2	23	1	105-5	69	140-2	3-51	270-2	13-19	209-6	3-27	152-4	3-72	67-3	2-92
2	2	Constitutional " ...	...	...	187	1	411	4	638	4	264	2	153	3	36	...	125-5	69	120-3	1-17	202-0	1-73	144-1	1-09	234-4	5-57	105-3	...
		II. Local Diseases.																											
		Diseases of the—																											
1	1	Nervous System ...	...	...	37	2	57	1	48	7	45	3	42	4	2	...	25-7	1-39	16-7	7-23	15-4	2-25	24-6	1-63	78-0	...	11-7	5-85
2	2	Eye ...	...	...	...	16	73	...	79	...	24	...	8	...	2	...	10-4	...	21-4	...	25-4	...	13-1	...	14-9	...	...	5-8
3	3	Ear ...	...	...	...	13	...	...	42	...	22	...	2	...	...	...	9-0	...	10-2	...	13-5	...	12-0	...	3-8	...	...	...
4	4	Nose ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	5	Throat ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	6	Circulatory System	24	7	61	5	41	4	29	4	35	2	7	1	23-6	4-86	17-8	1-46	13-2	1-29	15-3	2-18	65-0	3-72	20-5	2-92
7	7	Alimentary ...	...	...	...	25	111	...	90	...	27	1	25	...	...	...	17-3	...	32-5	...	23-0	...	14-7	...	4-5	...	...	8-8
8	8	Respiratory " ...	...	...	...	78	1	144	2	103	2	103	5	30	6	...	54-1	69	43-1	5-9	33-1	6-4	56-2	5-5	57-1	17-5	...	...
9	9	Digestive "	240	10	1,143	12	1,073	29	660	5	310	2	75	8	235-9	6-93	334-5	3-51	345-1	9-33	360-3	2-73	576-2	3-72	219-3	23-40
10	10	Urinary " ...	...	...	...	84	...	313	...	358	...	123	...	39	...	16	...	61-1	91-6	...	115-2	...	67-1	...	72-5	...	46-8	...
11	11	Generative " ...	...	...	...	39	...	46	...	22	...	14	...	2	...	2	...	13-4	...	...	22-2	...	12-0	...	26-0	...	...	6-8
12	12	Organs of Locomotion ...	...	...	...	8	...	16	...	13	...	8	...	7	1	...	...	5-5	4-8	...	6-8	...	7-1	...	13-0	...	...	...
13	13	Cellular Tissue ...	...	...	...	18	...	55	...	28	...	5	...	...	...	1	12-5	16-1	...	19-6	...	15-3	...	9-3	...	...	2-9	...
14	14	Cutaneous System ...	...	...	...	162	...	338	...	257	...	162	...	39	13	...	112-4	...	98-9	...	82-7	...	88-4	...	72-5	...	33-0	...
		III. Conditions, &c.																											
		Debility...	...	...	124	...	113	...	62	...	106	...	83	...	24	...	86-1	...	33-1	...	19-9	...	57-9	...	154-3	...	70-2	...
		IV. Petens	...	...	24	...	37	4	28	1	13	1	...	...	...	...	16-7	...	10-8	...	9-0	32	9-8	...	...	...	...	...
2	2	V. Injuries.	...	...	190	4	393	2	366	3	237	1	32	1	18	1	124-9	2-78	115-0	5-9	117-7	96	129-4	5-5	59-5	1-86	52-6	2-92
		Accidental Self-inflicted	...	...	1	1	1	3	1	4	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		VI. Surgical Operations																											
		No appreciable disease	...	...	...	...	14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Total	1,625	27	3,843	45	4,172	96	2,267	24	906	11	230	13	1068-3	18-72	1124-7	13-17	1341-9	9-80	561237-4	13-10	1684-0	20-45	672-5	5-83-01	

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Stations	Presidency Circle.	Mysore Circle.	Hyderabad Circle.	Bimniah Circle.	Depda.	On the March.	Presidency Circle.	Mysore Circle.	Hyderabad Circle.	Bimniah Circle.	Depda.	On the March.
Strength	1,441	3,417	3,109	1,832	538	342						
Annual Ratio per 1,000 of Mean Strength.												
General Diseases.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.	Admitted.
	Died.	Died.	Died.	Died.	Died.	Died.	Died.	Died.	Died.	Died.	Died.	Died.
<i>Febrile—</i>												
Eruptive Fevers	1	3	8	...	...	...	7	...	2	...	...	...
Continued "	43	241	11	212	4	186	29	8	...	...	...	...
Paroxysmal Fevers	106	189	1	525	1	196	73	6	...	...	...	...
Malignant Cholera	...	2	74	36	...	...	...	...	...	...	...	...
Influenza	1	4	12	...	...	...	7	...	...	...	...	...
Erysipelas	1	15	3	...	...	...	7	69	4	...	...	...
Other Diseases of this Group	...	5	6	...	2	...	...	...	1	...	...	...
<i>Constitutional—</i>												
Rheumatism	31	164	149	1	69	...	21	5	...	48	0	...
Syphilis	127	183	414	1	181	...	88	1	...	53	6	...
Scurvy, Pothia, &c.	28	43	21	2	22	2	19	4	69	12	6	1
Scurvy and Purpura	1	...	1	...	1	...	7	...	...	...	...	...
Anemia	...	20	40	...	...	...	...	5	8	...	...	...
Other Diseases of this Group	...	1	4	...	1	...	...	...	...	...	...	...

GENERAL DISEASES were less prevalent than in 1870 in all the Circles, and were also less fatal in the Presidency and Birmah Circles and among troops on the march, but more fatal in the others. The increase in the deaths was nearly all in the febrile group.

Eruptive Fevers.—The Hyderabad Circle was the only one in which these exceeded the average, and this owing to the admission of 4 cases of scarlet fever in the 44th Regiment immediately after its arrival at Kamptee. Some cases had occurred on board the 'Malabar' on the voyage out, and it was believed that the disease had been thus brought to Kamptee. Several of the women and children became affected with sore throat attended with fever, but without any eruption, and the disease did not spread further. As a measure of precaution these cases were all carefully isolated from the rest of the troops.

Continued Fevers were less prevalent than in the preceding year in all the Circles, except Hyderabad in which there was a very trifling increase. They were more prevalent among troops on the march, but in 1870 the proportion among them had been very low, and the increase has been more than compensated by a reduction in paroxysmal fevers. Birmah continued to furnish the highest proportion of fevers of this type from the prevalence of febricula, in many instances the result of intemperance, among the men of the 2nd Battalion 21st Regiment, at Thayetmyo and Tonghoo. Rangoon was remarkably free from continued fevers.

Paroxysmal Fevers.—The admissions by these were considerably lower than in 1870 in all the Circles but the Mysore. In it there was an increase of 20 per 1,000, but even with this the ratio was under that of any of the other Circles. It was highest in the Hyderabad Circle, owing to the prevalence of ague at Kamptee, where the admissions amounted to 369 per 1,000 of the force. Ague was more prevalent in the 79th Regiment than in the Artillery, but even in the latter the admissions were upwards of one-fourth of the average strength.

Cholera did not prevail as an epidemic among the troops at any station but Secunderabad, indeed with that exception there were only two cases reported, one at Bangalore and the other at Cannanore, and both recovered. At Secunderabad, however, it attacked the 18th Hussars with great virulence in the end of May. The first case in the Regiment occurred on the morning of 25th May, and between that date and the 4th of June there were 71 men, 5 women, and 9 children attacked, of whom 33 men, 2 women, and 4 children died. No case occurred among the officers. Immediately the disease appeared the Regiment was moved into camp, and remained under canvas till 23rd June, having changed ground six times during that period. Three-fourths of the cases occurred in the first three days of the epidemic. The disease was confined to the Europeans, the native followers of the corps having completely escaped. On the first outbreak of the epidemic two men of the C Battery 20th Brigade Royal Artillery were attacked and died, but the disease did not spread in it. In the beginning of July, a sporadic fatal case occurred in the 2nd Battalion 24th Regiment, at the same station. There were no other cases among the men during the year.

Rheumatism.—There was a decrease in this disease in Birmah, where the ratio stood highest in 1870, and among troops on the march, and an increase in the other Circles, the depôts of course being omitted from the comparison.

Syphilis.—There was a decrease in the admissions in the Presidency and Mysore, and an increase in the Hyderabad and Birmah Circles, and also among troops on the march. The ratio in the Hyderabad Circle was extremely high, the great excess occurring at Kamptee, where the admissions were 198 per 1,000 of the strength, but even at Secunderabad they amounted to 101 per 1,000. The ratio was also above the average in Birmah, from the prevalence of syphilis at Rangoon, where the ratio was 148 per 1,000 of the strength.

Scrophula and Pthisis.—The ratio of admissions by these diseases was higher than in 1870 in all but the Hyderabad Circle in which it was identical in the two years. There was a slight increase in the total mortality, but both it and the admissions were lower than in 1869. The variation is, therefore, probably but a result of the fluctuations arising from limited numbers.

Anæmia.—The admissions under this head were unusually numerous in the Hyderabad Circle, owing to 33 cases having been so returned by the

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Surgeon of the 18th Hussars. No remarks on these cases were made by him in his report, but it is presumed they were men whose general health had become impaired by a prolonged residence at Secunderabad.

LOCAL DISEASES.—There was a reduction in the admissions by *diseases of the nervous system* in all the Circles except Birmah. There was an increase at the depôts, but this of course was the result of the class of cases sent there from the other stations. Throughout the Command there was a decrease in *diseases of the nervous system* to the extent of 4 per 1,000 in the admissions, and 2·20 per 1,000 in the deaths. The most frequent cause of admission was neuralgia of malarious origin. There was no marked amount of cases of sunstroke at any of the stations.

There was a decrease in the prevalence of *diseases of the eyes* in all the Circles except Hyderabad, where the ratio in the two years was identical.

Diseases of the Circulatory System were less prevalent and fatal than in 1870 in the Mysore Circle, but furnished a higher ratio of cases in all the other Circles. Palpitation of the heart, unconnected with organic disease, was the most prevalent affection. The ratio of both admissions and deaths was highest in the Presidency Circle.

Diseases of the Respiratory System.—There was a decrease in the prevalence of these diseases in all the Circles except the Presidency, where the ratio remained unchanged, and Birmah where there was an increase. There was a slight increase of them among troops on the march, but the ratio was still very low. They were a cause of very little mortality.

Diseases of the Digestive System.—The admissions and deaths by this class of diseases were higher than in 1870 in the Mysore and Hyderabad Circles, they were lower in the Presidency Circle, at the Depôts and on the march, and in Birmah the ratio of admissions remained the same, but there was a trifling increase in that of the deaths. Dyspepsia was the disease which gave rise to the largest number of admissions in this class, and hepatitis of deaths. Hepatitis and dysentery caused all but three of the deaths.

The following Table shows the relative prevalence and mortality of dysentery, diarrhoea and hepatitis, the three most important and closely allied diseases of this class at each of the principal stations in the Command :—

Stations.	Admitted.	Died.	Stations.	Admitted.	Died.
Fort St. George and Palaveram ..	111·7	6·49	Secunderabad ..	287·7	12·20
St. Thomas's Mount ..	214·4	5·16	Kamptee ..	84·9	..
Trichinopoly ..	137·8	14·08	Rangoon ..	265·8	4·97
Bangalore ..	102·9	1·27	Thayetmyo ..	296·8	..
Cannanore ..	307·3	7·01	Tonghoo ..	174·6	..
Bellary ..	116·1	1·18	Port Blair ..	136·4	9·09

Compared with the preceding year, there has been an increase in the admissions at Fort St. George, Cannanore, Rangoon, Thayetmyo and Port Blair, and a decrease at all the other stations. The lowest ratio of admissions was at Kamptee, and the highest at Cannanore; the ratio was also very high at Secunderabad, Rangoon, and Thayetmyo. The deaths are too few in number to justify any deductions from the results of a single year.

Diseases of the Urinary System were less prevalent than in 1870 in the Presidency and Birmah Circles, and more prevalent in the others. The decrease was most marked in the Presidency, and the increase in the Hyderabad Circle, and in both occurred chiefly in gonorrhoea.

CONDITIONS, &c.—There was an increase in the admissions under the head of general debility in the Presidency and Mysore Circles, and a decrease in Hyderabad and Birmah. The Presidency had much the highest ratio, owing

to the return under that head of 115 cases in the 45th Regiment. The Medical Officer in charge states that 23 of these were the result of long Indian service, and no less than 87 caused by intemperance.

Poisons.—There was an increase in the admissions under this class in the Mysore and Hyderabad, and a decrease in the Presidency and Birmah Circles. There were four admissions from the effects of vegetable poisons, one of them by *Datura Stramonium*, and the other three are reported by the Surgeon of the 44th Regiment as “cases of great inflammation of the skin with febrile symptoms produced by the incautious use of the marking nut; the inflammation of the skin in these cases was of extraordinary severity.”

The admissions and deaths by delirium tremens in each of the Circles during the year were as follows :—

Circle.	Admitted for Delirium Tremens.	Died.	Ratio per 1,000 of Strength.			
			1871.		1870.	
			Admitted.	Died.	Admitted.	Died.
Presidency	21	1	14·6	·69	6·4	..
Mysore	27	2	7·9	·59	5·1	..
Hyderabad	20	1	6·4	·32	3·8	·32
Birmah	26	2	14·2	1·09	16·6	1·23
Depôts .. ..	..	..	..	..	16·1	..
On the March .. ..	..	..	..	..	..	..

There has been an increase in the prevalence of this disease in all the Circles except Birmah, where there has been a slight decrease, but in both it and the Presidency the ratio was double that of the other two circles. There were no cases admitted at any of the Depôts nor on the line of March.

The sickness and mortality of each corps serving in the Command, during the year, are shown in the following Table :—

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
CAVALRY.								
16th Lancers ..	486	503	5	..	5	1084·9	10·29	Bangalore Secunderabad On march
18th Hussars ..	398	713	55	2	57	1791·4	143·21	
Total Cavalry ..	884	1,216	60	2	62	1375·7	70·13	
								Months. 12 10½ 1½

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Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
R.L. ARTILLERY.								Batt. Months
D Brigade R.H.A.	356	550	3	..	3	1544.9	8.42	A, Kamptee 11½
								On march ½
								B, Bellary 11
								On march 1
								C, Secunderabad 2
								Embarked for England.
								D, Bangalore 2
								Embarked for England.
								No. 1, Rangoon ½
								On board ship ½
5th Brigade R.A.	446	419	4	1	5	939.5	11.21	St. Thos. Mt. 10
								On march ½
								Cannanore 1
								No. 2, Madras 11
								On board ship ½
								Rangoon ½
								No. 3, Tonghoo 10
								Rangoon 1
								Moved to Bengal.
								No. 4, St. Thos. Mt. 1
6th „ „	34	44	1	..	1	1294.1	39.41	Rangoon 9½
								On passage by river ½
								Tonghoo 2
								No. 5, Rangoon 12
								No. 6, St. Thos. Mt. 12
								No. 7, Bellary 5
								Madras 1
								No. 7, Secunderabad 6
								A, St. Thos. Mount 6
								G, Kanaptee 12
9th „ „	388	496	7	1	8	1467.4	23.67	C, Secunderabad 12
								A, St. Thos. Mount 6
								B, Trichinopoly 12
								C, Secunderabad 12
								D, Kamptee 12
								E, Cannanore 10½
								On march ½
								Bangalore ½
								No. 1, Bellary 6
								A, Birmah 1½
20th „ „	678	928	14	1	15	1370.8	22.28	On board ship ½
								St. Thos. Mount 10½
								B, On board ship ½
								Thayetmyo 11½
								C, Bangalore 12
								D, Bangalore 10
								On march 1
								Bellary 1
								No. 5, Secunderabad 6
28rd „ „	586	679	10	..	10	1158.7	17.06	
Total R ^l . Artillery	2,433	3,111	39	3	42	1278.7	17.26	

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
INFANTRY.								
2nd Bn. 10th Foot	826	909	17	2	19	1100·4	23·00	Months. On march 1 Rangoon, with Det. 1 at Port Blair 11½ Bangalore 12 Thayelmyo 12 Tonghoo 12 Secunderabad 12
1st „ 21st „ ..	810	935	7	2	9	1154·3	11·11	Arrived from England.
2nd „ 21st „ ..	503	378	13	1	14	1745·5	27·83	Kamptee, with Det. 1 at Seetabuldee 1½
Ditto, Left Wing	318	395	3	..	3	1242·1	9·43	Madras, with Det. 1 at Trichinopoly 12
2nd Bn. 24th Foot	874	898	17	2	19	1021·7	21·74	Bellary 10½ En route to Aden.
44th Foot ..	140	187	..	..	..	1335·7	..	Left Wing, Bangalore 1 At sea and on march 1½ Secunderabad 9 Hd. Qrs., Rangoon 1 At sea and on march 1½ Secunderabad 10
45th „ ..	936	961	10	1	11	1016·0	11·75	Kamptee, with Det. 1 at Seetabuldee 8½ En route to Bom- bay
3rd Bn. 60th Foot	710	554	7	..	7	780·3	9·04	Cannanore 12
76th Foot ..	924	1,231	16	..	16	1332·0	17·32	
79th Foot ..	478	615	6	..	6	1286·6	12·55	
89th Foot ..	899	1,068	20	..	20	1149·0	22·25	
Total Infantry..	7,418	8,581	116	8	124	1156·7	16·72	

There was a death of an Army Schoolmaster at Secunderabad.

The ratio both of admissions and deaths was highest in the Cavalry and lowest in the Infantry. The mortality of the Artillery was very little above that of the infantry. The very high ratio of deaths in the Cavalry was the result of cholera in the 18th Hussars, and the excess in the admissions was due to that disease, diarrhoea, and continued fever in the same corps.

In the Artillery the D. Brigade Royal Horse Artillery had the highest ratio of admissions and lowest of deaths; the 5th Brigade Royal Artillery had the lowest ratio of admissions, and the 6th Brigade the highest of deaths.

In the Infantry the ratio of admissions and deaths was lowest in the 3rd Battalion 60th Regiment, at Bellary, that of admissions was highest in the 2nd Battalion 21st Regiment at Thayetmyo and Tonghoo, and of deaths in the 2nd Battalion 10th Regiment at Rangoon.

The mortality was highest in the right wing of the 2nd Battalion 21st Regiment, but taking both wings together it only amounted to 20·70 per 1,000.

SANITARY REPORT.

Surgeon-General Currie, O.B., makes the following observations in his Sanitary Report:—

GENERAL HEALTH.—The health of the troops in the Madras Command has been very favourable during the past year, and the returns of sick contrast favourably with those of many previous years.

Epidemics.

EPIDEMICS.—Cholera was the only disease which prevailed epidemically during the year under report.

A remarkably virulent outbreak of the disease occurred in the 18th Hussars at Secunderabad.

The investigations which were instituted at the time, clearly established that the disease had been imported into Secunderabad by a party of travellers, who arrived from the east coast on the 18th May, and of whom three died on the 21st.

SMALL-POX.—Has not prevailed epidemically during the year. Vaccination has been carefully attended to. Re-vaccination, it may be mentioned, has been performed to a large extent in several corps, during the cold season of 1871-72, in consequence of the prevalence of small-pox amongst the native population in many parts of the country.

Marches.

The troops were free from epidemic disease during the marches of the year under report.

Presidency Circle.—There are no changes to report on the barrack accommodation in this circle during the year.

Barracks.

Fort St. George.—The Infantry barracks are situated within the ramparts of the fort, and about 20 feet above the level of the sea. The blocks of buildings run north and south, facing east and west, which is favourable as regards the sea breeze, but the effect of this is a good deal influenced by high buildings on the east or sea side of them. The barracks are double-storied, the rooms lofty, the lower being 15½ feet, and the upper 14½ feet in height, with lateral doors and windows, and with inner and outer verandahs. Both stories are occupied by the troops as dormitories. The ventilation of the upper rooms is good, but that of the lower is less effective, in consequence of the position of neighbouring buildings. The married quarters are also in double-storied buildings and are very good, each family having two comfortable rooms of good size. The garrison battery of Artillery occupies the casemated barracks. The accommodation is fairly good of its kind.

St. Thomas' Mount.—The barrack accommodation at present consists of the North, South and Horse Artillery barracks. The two former are low buildings, and but indifferently ventilated. These will shortly be superseded (probably by the end of the year) by the lofty double-storied barracks, which are being built on the fine open site at the Palaveram end of the station. The married quarters belonging to the north and south barracks are 20 in number, allowing to each family two moderately good rooms. But the married quarters of the Horse Artillery, 32 in number, are very superior, being on the cottage system, standing in separate compounds, and provided with cookhouse and latrine in opposite corners of the enclosure. These well raised cottages form the most comfortable married quarters that I have seen in any part of India.

Poonamallee.—The station is healthy, and the position of the barracks good, but the buildings themselves are very old, low and narrow, and the accommodation, though sufficient in amount, is of a very inferior description. Some of the barracks have been improved in respect of ventilation, but others have not yet been provided with ridge ventilators. The subsidiary buildings are sufficient for the requirements of the dépôt, though none are really good. A few years ago it was proposed to abandon this station and to build a new barrack for the convalescent and invalid dépôt at Ennore, on the sea coast, 10 miles north of Madras. This was an excellent proposition, but was given up for financial reasons, and there does not appear to be any immediate prospect of the subject being taken up again.

Wellington Sanitarium.—Is situated on the plateau on the Neilgherries, 6,000 feet above the level of the sea. The site is very good and well exposed, and the barrack accommodation is sufficient for 560 men, and 120 married families. The barracks are double-storied in 6 blocks. The rooms lofty, well lighted and ventilated, and a fireplace in the end of each.

Trichinopoly.—A battery of Artillery and two companies of Infantry are stationed here. The battery is quartered in a fine large building which was formerly a private residence. The sanitary condition of the building itself is unexceptionable, but unfortunately it is surrounded by extensive rice fields,

which are the supposed source of ague during the rainy season. The Infantry barracks consist of four blocks of buildings with thatched roofs. The accommodation is good and sufficient. There is also good married accommodation for eight families.

Mysore Circle.—Deputy Inspector-General Barclay reports: "There are no important changes to record in the barracks in the Circle during the year. At Bellary some new quarters for the families of the Royal Horse Artillery, affording excellent accommodation, have been handed over for occupation, and at Cannanore a new range of regimental offices has been built for the Infantry."

Bangalore.—Is situated on an undulating plain forming part of the table land of the Mysore District, and at an elevation of 3,000 feet above the level of the sea. The cantonment is thickly wooded and free from jungle. There are no rivers in the vicinity, but tanks abound. The Horse Artillery barracks consist of two blocks of single-storied buildings with verandahs all round, and ridge ventilators. The site is somewhat low and too near the Ulsoor Bazaar. The field batteries occupy four detached blocks on the old race-course, which are constructed on the most approved plan, and are admirably ventilated. The site of these barracks is unexceptionably good. The Infantry barracks, situated on sloping ground, consist of 10 single-storied blocks, each holding a company. The sanitary condition of these barracks is very good, and there is no overcrowding. The married quarters are also very good. Cavalry barracks, situated on the old race-course: these are ordinary single-storied buildings with long centre rooms and double verandahs. They are in fair sanitary condition, but there are original defects in these barracks which are irremediable, such as the want of elevation of the floors, &c., &c.

Bellary.—The Artillery force at this station has been reduced in the course of this year to a field battery. The barracks, though old, afford ample accommodation for a field battery, and they are sufficiently ventilated. The Infantry barracks are in blocks one story high, and the floors are raised 2½ feet. Each barrack has a large centre room, calculated for 44 men, with end rooms for non-commissioned officers, and double verandahs. The rooms are well ventilated, and the accommodation is sufficient for a regiment of ordinary strength. Punkahs and kus-kus tatties are in use during the hot months.

Ramandroog Sanitarium.—38 miles from Bellary, and 3,500 feet above the level of the sea. Site good, barracks placed on south-west extremity of plateau, facing the north, with open verandah in front. The rooms are sufficiently lofty and well ventilated, and calculated to accommodate about 70 men.

Cannanore.—The Artillery here has been reduced in the course of the past year from a field to a garrison battery. The barracks, consisting of two blocks, are built of latine, with tiled roofs, verandahs and boarded floors. The Artillery barrack rooms are good as regards height, general construction and ventilation, and the accommodation is ample. The position of the Infantry barracks at Cannanore is very good, and about 300 yards from the sea, but the advantages of site are much impaired by the crowded state of the buildings. The floors are boarded and slightly raised above the ground. The rooms as regards height and general construction are good, and the means of ventilation are ample. Considering the climate and great rain-fall on the Malabar coast, the barracks at this station should be double-storied, or what is equally advantageous as regards health, and much less expensive, should be built on well raised plinths or on arches. The small detachments from Cannanore, at Calicut and Malliappoorum, are well accommodated in barracks and houses that were originally built for private residences.

Hyderabad Circle.—The administrative Medical Officer reports that, "there has been no alteration in the barracks occupied by the troops at Secunderabad excepting some minor improvements in the Cavalry barracks, such as the removal of an objectionable latrine and urinal, the construction of saucer drains and cisterns." At Trimulgherry nothing of any consequence has been done. Cavalry barracks—The site of these barracks is radically bad, but the rooms as regards height, ventilation and general sanitary requirements, are

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probably in as satisfactory a state as their original construction will admit of. New double-storied barracks for the Cavalry regiment at this station are now being built between Trimulgherry and Bolarum. A garrison battery is quartered in a large bomb-proof building entrenched at Secunderabad.

Trimulgherry.—Three miles from Secunderabad, garrisoned by Artillery and two regiments of Infantry. The Artillery barracks consist of four blocks of single and six of double-storied buildings. The site is good and the buildings excellent. Each single-story block is divided into two large rooms and central dining hall. The double-storied blocks have two large (dormitories) rooms above, with sergeants' quarters in the centre, on ground floor, dining hall and offices, &c. It is scarcely necessary to add that the sanitary condition of these barracks is exceptionally good. Infantry barracks consist of eight blocks of single-storeyed buildings in two rooms, having inner and outer verandahs. The rooms in each block are 172 by 24 feet. The accommodation which these barracks afford is good and ample. The centre rooms only are used as dormitories. Infantry barracks: these likewise present an imposing appearance, and cover a large extent of ground. The accommodation afforded by these magnificent buildings is of a superior character, and ample for a regiment.

Kamptee.—The site of the barracks at this station has been much criticised. The barracks occupy the lowest part of the cantonment, which is often swampy after heavy rain, and they are unfavourably placed in regard to the prevailing winds; and to make the faulty position worse, the wash-houses, urinals, latrines, &c., are placed to windward of them. The Horse Artillery barracks consist of two one-storied blocks on opposite sides of a square, and two other barracks of field batteries. These barracks are faulty in general construction, and the floors are scarcely at all raised above the ground. There is ample accommodation for the Artillery force here, since the troop of Horse Artillery went home. Ventilation sufficiently maintained by doors, windows and ridge ventilators. Infantry barracks: these consist of ten blocks. Each barrack has a long central room, divided by archways into three compartments, and surrounded by a wide inclosed verandah. The centre rooms communicate with the verandah by means of open arches. Ventilation is sufficiently maintained by doors, windows and ridge ventilators. There has been no overcrowding, and the accommodation may be pronounced fairly good. From Kamptee there is a small detachment of 20 men at Seetabuldee, very favourably situated as regards accommodation.

Burmah Circle.—In this Circle no changes are reported on the condition of the barracks.

Rangoon.—Garrison, two batteries of Artillery and a regiment of Infantry, with detachments at the Andamans. The Artillery barracks are well placed, and are constructed entirely of teak, raised on piles from 6 to 8 feet from the ground, having steps at each end and sides. The roofs are shingle. The rooms are high and comfortable and well ventilated, and there has been no overcrowding. On the left bank of the Rangoon River are situated the Infantry barracks, about half a mile from the town of Rangoon, on rather high ground, having good natural drainage. These barracks are similar in point of construction to those of the Artillery, and were built 17 years ago. They are now rather infirm, and it is in contemplation to build new ones on the same site.

Thayetmyo.—Garrison, one field battery and head-quarter wing of a regiment. The cantonment is near the left bank of the Irrawaddy, on low undulating ground, and surrounded by an amphitheatre of low hills about four miles off. The site is not an eligible one in a sanitary point of view, but the construction of the barracks themselves, both as to elevation and plan, is admirable, and this compensates to some extent for the disadvantages of position. The barracks are built of teak, raised on piles 9 feet above the ground, and are spacious and well ventilated.

Tonghoo.—Garrison, one battery of Artillery and wing of the regiment, head-quarters at Thayetmyo. Tonghoo stands on the right bank of the Sitang river, 40 miles from the frontier, and 200 from Rangoon. The site of the cantonment is slightly elevated, the surrounding country being low, flat and swampy during the rainy season. The barracks are similar in point of

construction to those at Rangoon and Thayetmyo. The accommodation is ample and good.

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Andamans.—Port Blair. Detachment 110. The large new stone barrack is built on a ridge on the north end of Ross Island, and 150 feet above the level of the sea, and is freely exposed to both monsoons. This is a large handsome building 534 feet in length, 50 in breadth, and 24 in height, and is sub-divided into four dormitories and a dining hall. The rooms are lofty and well ventilated, but in consequence of the walls of a portion of the north end becoming cracked soon after the building was handed over for occupation, 30 men were removed, and have since been quartered in a wooden barrack close by.

Presidency Circle.—There are but few changes to report on the state of the Hospital. hospitals in this Circle. The sick of the regiment and battery of Artillery quartered in Fort St. George, are treated in the military division of the general hospital. This, as is well known, is a large double storied building about three-quarters of a mile from the fort. The accommodation is ample and fairly good, particularly in the upper wards. An important improvement has lately been introduced into this hospital, which consists in the pun-kahs being pulled by steam power. This experiment has proved a great success, and I hope financial considerations will not prevent the system being extended to the barracks.

St. Thomas's Mount.—The Artillery hospital is a good flat-roofed double-storied building, well raised from the ground, having two wards above and two below, airy and well ventilated. These wards afford excellent accommodation for 40 sick. The female hospital is a fine large new double-storied building, having separate accommodation for ordinary cases of disease, contagious diseases and lying-in patients.

Poonamallee.—The hospital, like the barracks, is an inferior building, a new temporary hospital has lately been sanctioned.

Trichinopoly.—The hospital is about half a mile from the barracks. The accommodation which it affords is good and ample for the sick of the small garrison.

Wellington.—Here the hospital consists of two blocks of single-storied buildings, having two large wards in each. The accommodation is ample and free from sanitary defects. The portion of the establishment for sick women is somewhat limited, but, I believe, little or no inconvenience has resulted therefrom.

Mysore Circle.—The administrative Officer reports that there are no important changes. At Bangalore the respective hospitals of the Artillery, Cavalry and Infantry are favourably reported upon; and the new female garrison hospital is pronounced, in respect of site, plan and construction, to be nearly perfect.

Bellary.—The hospital accommodation at this station is good and sufficient for the sick of the garrison. A new female hospital has been finished, but it has not yet been given over for occupation. This is a double-storied building of a superior description.

Ramandroog.—Here the sick are located in a comfortable building.

Cannanore.—In consequence of the Artillery force at this station having been reduced from a field to a garrison battery, the sick of the Artillery are now treated in the Infantry hospital, and the Artillery hospital is utilized as a garrison female hospital, for which it is well adapted. No change in the Infantry hospital during the year.

Hyderabad Circle.—*Secunderabad:* No change has been made in the Cavalry hospital. The sick of the Artillery at Trimulgherry continue to be treated in one of the double-storied barracks of the Horse Artillery. The hospital accommodation of the two Infantry regiments at Trimulgherry is sufficient and in good sanitary condition.

Kamptee.—The sanitary condition of the Artillery and Infantry hospitals at this station is pronounced satisfactory.

Burmah Circle.—*Rangoon:* The hospital accommodation at this station is very good, and sufficient both for men and women. The hospital buildings are constructed on the same plan as the barrack blocks, and have double

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roofs, the outer projecting beyond the side walls, and protecting the latter from sun and rain.

Thayetmyo.—The fine barracks and all the subsidiary buildings may be said to be complete, with the exception of the hospitals. Heretofore the sick have been accommodated in barrack buildings utilized as hospitals. These have proved suitable enough. The new hospital for the Artillery approaches completion.

Tonghoo.—Here too, the hospital is one of the ordinary barrack blocks.

Port Blair.—At this port the hospital accommodation is reported to be very good.

Latrines.

Presidency Circle.—At Fort St. George and St. Thomas's Mount the latrines are on the dry-earth system, and constructed on the self-acting principle, and are provided with all the necessary appliances for effectually carrying out the dry-earth system of conservancy. The latrines so constructed are greatly approved of. At the other military stations in this Circle, dry-earth and tarred tubs are in general use, and with very unsatisfactory results. Urinals consist of tarred iron cylinders or tubs.

Mysore Circle.—The administrative Medical Officer reports, "that new" latrines, adapted for the dry-earth system, have been completed at Bellary "and Ramandroog, but they had not been handed over at the end of the "year." At Bangalore, a few latrines of the Cavalry barracks have been temporarily adapted for the dry-earth system, and their condition since its introduction is incomparably better than it was before. In most of the Infantry barracks that system is nominally carried out with the old tarred tubs. At the stations on the western coast the system has not even been nominally introduced, except at Malliapoorum, and the condition of the latrines there is very satisfactory.

Hyderabad Circle.—In none of the latrines in this Circle has the dry-earth system, properly so called, been introduced. Here, as elsewhere, dry-earth and old tarred tubs are in use. Until the latrines have been adapted to the improved system, and all the necessary appliances provided, the advantages of the dry-earth system of conservancy cannot be realized.

Burma Circle.—In this circle the dry-earth system in a modified form is carried out at Rangoon and Tonghoo.

Water Supply.

Presidency Circle.—The water supplied to the troops at Fort Saint George, St. Thomas's Mount, Poonamallee, and Trichinopoly, is obtained from wells. The water is of good quality and abundant at all these stations except St. Thomas's Mount, where the supply is sometimes barely sufficient in the hot months.

Water-works on a large scale are being constructed at Madras by the municipality, and by the end of the present year the native town and European settlement will be abundantly supplied with good and wholesome water derived from the large reservoir at Red Hills, distant about 10 miles from the Presidency Town.

This will be a great boon to Madras, for at present water obtained from three-fourths of the wells is brackish, and the consequence is that those which furnish good water are being worked all day long.

At Wellington water of excellent quality is obtained from a running stream.

Mysore Circle.—The administrative Medical Officer reports "the water-supply continues unchanged throughout the circle. At Bangalore the filtration of the water of the Ulsoor Tank, which is forced up for ablutionary purposes to the Race Course plateau, is now much more successfully carried out and the water for the most part is perfectly good." Drinking water is obtained as heretofore from the Dhobies' wells, and additional precautions have been taken of late to ensure its being obtained from that source. At Cannanore water of good quality is procured from wells, and the supply is generally sufficient.

Bellary.—The barracks are supplied with water obtained from wells. The quality is reported good and the supply, though never abundant, is on the whole sufficient.

Ramandroog.—The water supply has been chiefly derived from a spring on the western slope of the hill. The quality of the water is good, and the supply is sufficient for all ordinary purposes.

Hyderabad Circle.—Secunderabad: The administrative Medical Officer reports that "the water supply has continued unsatisfactory during the year, the water being drawn from wells that are apt to become dry during the "hot season."

At Trimulgherry, where the Artillery and two regiments of Infantry are stationed, the plan for supplying the cantonment with water has made considerable progress during the year. The plan alluded to consists of a zinc roofed well, 50 feet deep by 30 feet in diameter; and the water is to be raised by steam-power into a lofty stand-pipe, flowing thence by gravitation into large cisterns. From these cisterns the water will be conveyed by main and smaller pipes to the barracks of the 2nd Infantry Regiment and the hospital common to both Infantry corps. The Artillery and 1st Infantry barracks will be supplied by a similar arrangement from another large well in the vicinity of the former.

Kamptee.—Here water is obtained from wells sunk to great depths and drawn by bullocks. The quality of water is good and no complaints have been made of the supply being insufficient.

Burmah Circle.—Rangoon: Water for drinking and cooking purposes is procured from wells. When the wells are pretty full the quality is good, but when they are low the quality greatly deteriorates. For ablutionary purposes the supply is supplemented from rain-water stored in tanks.

Thayetmyo.—For drinking and cooking purposes water is obtained from wells, and for all other purposes from the river.

Tonghoo.—Here water is good and abundant.

Port Blair.—Water for every purpose is obtained from two new wells. The quality is good and the supply plentiful.

Presidency Circle.—The state of the drainage at all the stations in this circle is satisfactory, with the exception perhaps of Fort Saint George, where the main drain from the town of Madras discharges its offensive contents near the north-east angle of the fort. Drainage.

Mysore Circle.—In this circle there are no changes to report on the state of the drainage.

Hyderabad Circle.—Secunderabad: The drainage in the Cavalry lines was improved after the outbreak of cholera in May last. Covered drains were converted into saucer ones. The surface drains constructed to carry off water during the rains in the vicinity of barracks, cisterns abolished, and open drains substituted, &c. At Trimulgherry there is no regular system of drainage. The want of effective drainage here has often been represented.

Kamptee.—No special reports have been made on the subject of drainage at this station. I conclude that it is in a satisfactory state.

Burmah Circle.—Rangoon: Here the drains are constructed of brick, and from the favourable site of the barracks the drainage is effective.

Thayetmyo.—The drainage is purely surface, and this is assisted by the natural fall to the river.

Tonghoo.—At this station the drainage was long defective, but this has now been remedied by the construction of effective brick drains throughout the lines.

Burmah Circle.—In this command the administrative Medical Officer reports that several obstacles are encountered in the way of the rationing of troops; such as the extreme difficulty of preserving sheep so as to afford mutton as a ration, the scarcity of vegetables and the expense of potatoes. Beef which forms the meat ration is quite as good as that usually issued in India, and it is notably good in Tonghoo. Potatoes are much more frequently issued than in former years, and when not procurable pumpkins, knoll-kholl, preserved potatoes, yams, &c., are substituted. Efforts are now being made to introduce the cultivation of potatoes in Burmah. Fresh pork, fed under direct superintendence, is supplied to the detachment at Port Blair, and the change from the beef ration is much relished. Mutton is issued to all hospitals every 2nd or 3rd day.

Workshops and gardening constitute the chief employment for soldiers in this country, and these are now encouraged in every corps. Employment.

It has been alleged, and with some show of reason, that workshops should be made schools of instruction more than they are at present, for the large Amusement.
Gymnastics.

Madras. number of soldiers who have not learnt any trade before entering the Service.

Soldiers are not employed in road-making in any part of this Presidency.

Out-of-door amusements comprise cricket, quoits, fives'-court, skittles, &c.

For indoor amusements—theatres, recreation rooms, &c., &c., are provided.

Gymnasia, more or less complete, are now established at nearly every station in the Presidency; all are in the open air. Financial considerations have as yet prevented the construction of any permanent buildings for this purpose.

In almost all considerable native towns municipal institutions are in force. Sanitary matters are generally much more attended to than they were.

Sanitary improvements progress at a slow rate in this Presidency; still there are some to record, such as the new Artillery barracks at St. Thomas's Mount, and the Cavalry barracks near Trimulgherry that are being pushed on towards completion.

The dry earth system of conservancy which was introduced into the other Presidencies, years ago, is being proceeded with at two or three stations, viz., Bangalore, Bellary, and Ramandroog. But I regret to add that a commencement has not yet been made at Secunderabad and Kamptee to adapt the old latrines to the dry earth system.

III.—BOMBAY.

Bombay.

THE average strength of the European force in the Bombay Command during the year 1871 was 10,838; the admissions into hospital among them were 16,236; and the deaths were 157, including seven among the invalids on their passage home and at Netley. These numbers give the annual ratio of 1,498 and 14·48 per 1,000 of mean strength, both considerably lower than in the preceding year.

The following Table, framed from Abstract No. 18 in the Appendix, shows the admissions and deaths by each class of diseases:—

Bombay.

Order.	Diseases.	Strength, 10,838.				Ratio per 1,000 of Mean Strength.			
		Admissions.	Deaths.			1871.		1869-70.	
			In India.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.								
1	Febrile Group ..	7,721	30	..	30	712·4	2·77	717·1	6·83
2	Constitutional „ ..	1,615	17	3	20	149·0	1·84	166·1	2·70
	II. Local Diseases.								
	Diseases of the—								
1	Nervous System ..	176	22	..	22	16·2	2·03	18·9	2·65
2	Eye	296	..	..	..	27·3	..	29·4	..
3	Ear	54	1	..	1	5·0	·09	6·4	..
4	Nose	4	..	..	..	·4	..	·5	..
5	Circulatory System ..	157	14	..	14	14·5	1·29	15·1	1·09
6	Absorbent „ ..	252	..	..	..	23·3	..	22·1	..
8	Respiratory „ ..	478	4	..	4	43·6	·37	47·8	·95
9	Digestive „ ..	2,244	36	4	40	207·1	3·69	222·6	4·08
10	Urinary „ ..	951	4	..	4	87·7	·37	76·6	·28
11	Generative „ ..	93	..	..	..	8·6	..	12·7	..
12	Organs of Locomotion..	50	..	..	..	4·6	..	3·8	·09
13	Cellular Tissue..	188	..	..	..	17·3	..	17·7	..
14	Outaneous System ..	720	..	..	..	66·4	..	72·5	·05
	III. Conditions, &c.								
	Debility.. ..	173	..	..	..	16·0	..	10·5	..
	IV. Poisons ..	101	7	..	7	9·3	·65	12·0	·43
	V. Injuries.								
2	Accidental	952	4	..	4	87·8	·37	79·5	·71
3	Homicidal	3	3	..	3	·3	·28	·2	·05
4	Self-inflicted	2	6	..	6	·2	·55	·2	·61
6	Judicial.. ..	..	2	..	2	..	·18	..	·05
	VI. Surgical Operations	3	..	..	..	·3	..	·1	..
	No Appreciable Disease	8	..	..	..	·7	..	·1	..
	Total ..	16,236	150	7	157	1498·0	14·48	1581·9	20·57
	Average of 10 years, } 1861-70 ..	..	..	..	..	1480·9	21·30	..	..

The admissions have been very slightly above, but the mortality one-third under the average of the preceding 10 years.

GENERAL DISEASES were rather less prevalent and only half as fatal as in 1870; the reduction occurred in both groups of these diseases.

The following Table shows the influence of the principal diseases of this class in causing sickness and mortality:—

Bombay.

General Diseases.	Admitted.	Died.	Ratio per 1,000 of Strength.			
			1871.		1869-70.	
			Admitted.	Died.	Admitted.	Died.
<i>Febrile—</i>						
Eruptive Fevers .. ..	..	..	..	..	1·2	·05
Continued „	1,901	17	175·4	1·57	137·9	1·85
Paroxysmal „	5,803	11	535·4	1·01	571·1	2·18
Malignant Cholera.. ..	..	..	..	..	4·3	2·70
Influenza	6	..	·6	..	1·0	..
Erysipelas	5	..	·5	..	1·0	..
Other Diseases of this group	6	2	·6	·18	·6	·05
<i>Constitutional—</i>						
Rheumatism.	480	..	44·3	..	40·9	·09
Syphilis	930	1	85·7	·09	97·9	·24
Scrofula, Phthisis, &c. ..	106	16	9·8	1·48	11·6	2·28
Scurvy and Purpura	5	..	·5	..	·9	..
Anæmia	77	1	7·1	·09	13·9	..
Other Diseases of this group	17	2	1·6	·18	·9	·09

There were no cases of *eruptive fevers* admitted during the year. *Continued fevers* were more prevalent than in 1870, but this was more than counter-balanced by a decrease in the admissions by *paroxysmal fevers*. There was not a single admission or death by *cholera* among the troops. *Rheumatism* was slightly more prevalent than in 1870, but there was a decrease of 10 per 1,000 of the strength in the cases of *syphilis*. The deaths by *scrofula*, *phthisis*, &c., and the admissions by *anæmia* were only half as numerous as in the preceding year.

LOCAL DISEASES.—The admissions by the various classes of local diseases have differed little from the preceding year. There has been an increase in eye diseases, and a decrease in those of the generative system.

POISONS.—Of the admissions under this class 67 were cases of delirium tremens, of which five died, and 32 were returned as poisoning by alcohol, of which two died; the other two cases were snake bites, neither of which proved fatal.

INJURIES.—Under the head of accidental injuries there has been an increase to the extent of 16 per 1,000 of the strength, but a decrease in the deaths. Of the six self-inflicted deaths, five were by gunshot and one by cut throat. Three men were murdered, all by means of fire-arms, and two were hanged for murder.

The following Table shows the admissions and deaths at each of the principal stations in the Command :—

Military Divisions.	Stations.	Average Annual Strength.	Admitted into Hospital.	Died in India.	Ratio per 1,000.			
					Admitted.	Died.	Average of 8 Years.	
							Admitted.	Died.
Presidency ..	Colaba	459	603	8	1313·7	17·42	1398·2	17·84
Poona ..	Poona.. .. .	1,335	2,378	15	1295·9	8·17	1266·2	13·48
	Sattara. . . .	183	455	6	2486·3	32·79	1075·4	9·51
	Ahmednuggur ..	640	838	5	1309·3	7·81	1396·9	11·81
	Asseerghur . .	124	146	1	1177·4	8·06	1342·9	17·26
	Belgaum	973	743	8	763·6	8·22	1113·6	10·76
	Kirkee	430	504	6	1172·0	13·95	1438·3	11·54
Mhow ..	Mhow	1,416	2,672	13	1887·0	9·18	1713·2	14·66
	Indore	118	120	2	1016·9	16·95	1639·0	12·03
	Neemuch	453	891	7	1966·8	15·45	2508·6	42·01
	Nusseerabad ..	719	1,926	13	2678·7	18·08	1960·0	34·68
Northern..	Deesa.. .. .	820	1,072	18	1307·3	21·95	1228·4	13·69
	Ahmedabad. . .	243	634	8	2646·0	32·92	1996·6	20·67
	Mount Abou ..	113	338	2	2991·1	17·69	1501·5	17·57
Scinde ..	Kurrachee.. ..	740	1,246	8	1683·7	10·81	1475·5	14·11
	Hydrabad .. .	290	343	4	1182·7	13·79	1209·1	13·78
	Aden	717	754	7	1051·6	9·75	1066·6	21·66
	Depôts Sanita- ria & Invalids }	223	649	16	2910·3	71·75	..	..
	On the March, &c.	315	247	3	784·1	9·51	1041·9	26·31

Compared with the results of the preceding year there has been an increase in the admissions at Poona, Sattara, and Ahmednuggur, Nusseerabad, Deesa, and Mount Abou, and a decrease at all the other stations. The mortality was higher at Sattara, Ahmednuggur, Asseerghur, Kirkee, Indore, Deesa, and Hydrabad. If the comparison be made with the average of the preceding eight years the only stations at which a marked increase in the admissions is observed are Mhow, Nusseerabad, Ahmedabad, Kurrachee, Sattara, and Mount Abou, and at the two last of these the force was small. The only stations at which the mortality was above the average were Sattara, Kirkee, Deesa, Ahmedabad, and to a very slight extent at Mount Abou and Indore.

The following Table shows the admissions and deaths by the different classes of diseases in each of the military divisions:—

[illegible]

Military Divisions ...	Presi- dency.	Poona.	Mhow.	Northern.	Scinde.	Aden.	Troops on the March.	Annual Ratio per 1,000 of Mean Strength.								Troops on the March.
								Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	
Average Annual Strength...	459	4,187	2,686	1,176	1,028	717	315									
General Diseases.																
<i>Fertile—</i>																
Continued Fevers ...	29	1650	3 148	11 294	171 3	288	22	63.5	...	250.8	71	88.6	4.08	199.0	...	...
Paroxysmal Fevers ...	128	3 1696	1 2684	4 617	3 479	60	55	278.9	6.64	381.2	24	996.5	4.18	594.6	2.55	466.0
Indigence ...	3	1	...	...	...	...	...	6.5	...	2	...	...	...	1.7	...	...
Erysipelas ...	...	2	...	2	...	1	...	...	...	5	...	...	...	1.7	...	...
Other Diseases of this Group ...	...	3	1 1 1	...	2	...	...	...	...	7	24	4	37	...	1.9	...
<i>Constitutional—</i>																
Rheumatism ...	16	126	...	178	...	51	12	84.9	...	30.1	...	66.0	...	46.8	...	33.1
Gyphitis ...	25	297	...	342	...	20	22	76.2	...	70.9	...	126.9	...	93.5	...	69.8
Scrofula, Phthisis, &c. ...	11	32	5 18	...	3 3	3	1	24.0	...	7.6	1.19	6.7	...	11.1	2.55	2.9
Scurvy and Purpura ...	1	...	...	...	1	...	1	2.2	...	...	...	...	...	...	...	1.0
Ascaris ...	8	23	...	...	3	...	...	17.4	...	5.5	...	8.5	...	37	2.5	2.9
Other Diseases of this Group ...	...	11	...	1	...	4	1	...	...	2.6	...	...	...	...	...	...

Bombay.

GENERAL DISEASES.—There was a considerable increase in the admissions by this class in the Poona and a moderate increase in the Northern Division ; in all the other Divisions there was a decrease, most marked in the Presidency. The mortality was lower than in 1870 in all the Military Divisions.

Continued Fevers were less prevalent than in 1870 in the Mhow and Scinde, but in all the other Divisions there was an increase in the admissions. This was most marked at Aden from the outbreak of an epidemic of dengue fever in the third quarter of the year. It is believed to have been introduced by trading vessels from Zanzibar, where the disease was then prevailing, and so rapidly did it spread that in July and August there were 224 cases admitted into hospital from a strength of 726 men. It attacked the women in nearly the same proportion, 23 cases having occurred in a strength of 71. The officers and children did not suffer to so great an extent, there having been only seven cases among 49 of the former and 16 among 121 of the latter. Though the disease was the cause of so much inefficiency it did not give rise to a single death.

There was a considerable increase in the prevalence of continued fevers at Poona, but this was confined to the 56th Regiment, which arrived at that station from England on the 9th of April, and had in nine months 746 admissions for simple continued fever from an average strength of 900 men, being in the annual ratio of 1,105 per 1,000 of mean strength ; none of the cases terminated fatally. The prevalence of the disease was ascribed by the Medical Officer in charge to the recent arrival of the regiment in India, the youth and inexperience of the men, 539 having been under 20 years of age, and 227 having less than one year of service, and to the fact that many of them were lads of inferior physique.

The mortality by continued fevers amounting to 1·57 per 1,000 of the strength was principally the result of enteric fever, 13 out of the 17 deaths having been returned under that head. The following were the stations at which the cases of enteric fever occurred :—

	Mean Strength.	Enteric Fever.	
		Cases.	Deaths.
Neemuch	453	7	4
Nusseerabad	719	6	5
Mhow... .. .	1,416	4	2
Kurrachee.. .. .	740	5	3

All the cases, therefore, except those at Kurrachee, occurred in the Mhow Division, and the greatest proportion of them at Neemuch.

Paroxysmal Fevers were more prevalent than in 1870 in the Poona and Northern, but much less prevalent in all the other Divisions ; the decrease was very great in the Presidency Division and at Aden, but was more than counter-balanced at the latter by the prevalence of the dengue fever. They were a source of great inefficiency in the Mhow Division, in which the admissions during the year very nearly amounted to the average strength, Nusseerabad, Mhow, and Neemuch being the stations at which they were most prevalent. The following summary shows the prevalence of these diseases in all the Corps at the three stations :—

		Mean Strength.	Admissions by Paroxysmal Fevers.
Mhow	15th Hussars.. .. .	482	530
"	E Bat. D Brig. R.H. Artillery ..	85	124
"	1st Bat. 6th Brig. Royal Artillery..	79	49
"	59th Regiment	927	837
Neemuch ..	D Bat. 18th Brig. Royal Artillery..	144	74
"	1st Bn. 8th Regiment	873	953
Nusseerabad.	D Bat. 9th Brig. Royal Artillery ..	128	171

So that in four out of the seven Corps at these stations the admissions by paroxysmal fevers exceeded the strength, and in none of the other three were they under half the strength. In the Poona Division the excess of admissions was chiefly in the detachment 49th Regiment at Sattara, the 3rd Hussars and Royal Horse Artillery at Ahmednuggur, and the Royal Artillery at Kirkee. In the Northern Division it occurred in the detachment 108th regiment at Mount Aboo and the two Batteries of Royal Artillery at Ahmedabad.

Rheumatism was much more prevalent than in 1870 at Aden, apparently in connection with the epidemic of dengue fever, and it was also much more prevalent among the troops on the march. On the other hand, there was a marked decrease in the Northern Division.

Syphilis.—As already stated there was a decrease in the admissions by this disease throughout the Command to the extent of 10 per 1,000. It was most marked in the Northern and Presidency Divisions, but also occurred among troops on the march, in the Poona Division, and at Aden. The decrease in these was to some extent counter-balanced by an increase in the Mhow and Scinde Divisions. The prevalence of syphilis at each of the principal stations in the Command, compared with it in 1870, is shown in the following Table :—

			1870.	1871.				1870.	1871.
Colaba	..	..	114·4	76·1	Neemuch	..	..	68·2	196·4
Poona	..	..	81·1	48·5	Nusseerabad	..	..	131·6	136·3
Sattara	..	..	2·1	27·3	Ahmedabad	..	..	96·2	28·8
Ahmednuggur	..	..	68·8	43·7	Deesa	..	..	223·2	107·3
Asseerghur	..	..	132·3	88·7	Mount Aboo	..	..	103·4	132·7
Belgaum	..	..	99·0	134·6	Kurrachee	..	..	98·1	90·5
Kirkee	..	..	119·8	76·7	Hydrabad	..	..	36·4	103·4
Mhow	..	..	106·8	93·1	Aden	..	..	44·5	27·8
Indore	..	..	139·5	186·4					

This Table shows an increase at Belgaum, Indore, Neemuch, Nusseerabad, Mount Aboo, and Hydrabad, at all of which this disease proved a source of very considerable inefficiency, and at Sattara, where the ratio of admissions, however, was still very low. At all the other stations there was a decrease, and at some of them to a very considerable amount.

Scrofula and Phthisis.—The ratio of admissions was very high in the Presidency Division, but it was probably merely a result of the small numbers under observation. It was higher than in 1870 also in the Northern Division, but lower in all the other Divisions. The reduction already noticed in the rate of mortality by these diseases was observed in all the Divisions except the Northern and Aden, at which in the preceding year no deaths by them had occurred.

Anæmia.—There was an increase in the proportion of cases returned under this head in the Presidency Division, but a decrease in all the others except Mhow, where it was identical in the two years.

LOCAL DISEASES.—There was a considerable increase in the admissions by diseases of the nervous system in the Northern, and a very slight one in the Presidency Division, but a decrease in all the others. The increase in the Northern Division was due to the occurrence of 17 cases of sunstroke at Deesa, of which four proved fatal; 14 of the cases and three of the deaths were in the 108th Regiment in the end of June and beginning of July. The ratio of admissions by these diseases, though slightly reduced, still continues high in the Mhow and Scinde Divisions,—in the former chiefly from the prevalence of neuralgia, probably of malarious origin, at Nusseerabad and, though to a less extent, also at Mhow, and in the latter from the occurrence of the same disease at Kurrachee.

Diseases of the Eyes.—There was a considerable increase in the prevalence of these diseases in the Scinde Division, and the admissions amounted to 46

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per 1,000 of the strength. The excess occurred chiefly in the 66th Regiment at Kurrachee, but the diseases did not become epidemic in it.

Diseases of the Circulatory System were much more prevalent than in 1870 in the Northern Division and the ratio of admissions was much higher than in the other Divisions. This increase was caused by the occurrence of a number of cases of palpitation of the heart in the 108th Regiment.

There was a marked increase in the admissions by *diseases of the respiratory system* in the Northern Division, chiefly from the prevalence of bronchitis during the first quarter of the year in the 108th Regiment at Deesa, and there was a great decrease in the Presidency and Scinde Divisions, and at Aden. The mortality by this class was very low.

Diseases of the Digestive System were more prevalent than in 1870 in the Mhow and Northern Divisions, and at Aden, but there was a decrease in them in the Poona, Scinde, and Presidency Divisions. The reduction was most marked in the Presidency Division; but in it the ratio of admissions had been higher than in any other in the preceding year. In 1871 the highest ratio of admissions was in the Scinde Division, chiefly from the prevalence of diarrhoea in the 66th Regiment at Kurrachee and Hyderabad. The mortality was highest in the Northern Division. Dysentery and diarrhoea, hepatitis, dyspepsia, and tonsillitis continue to furnish the bulk of the admissions by this class of diseases. The relative prevalence of dysentery, diarrhoea, and hepatitis, the three most important of these diseases, in each of the Military Divisions, is shown in the following Table:—

Military Divisions.	1870.	1871.	Military Divisions.	1870.	1871.
Presidency	276·6	146·0	Northern	107·3	144·5
Poona	97·4	67·6	Scinde	246·2	193·6
Mhow	139·9	153·7	Aden	84·5	140·8

This Table shows a decrease in the prevalence of these diseases in the Presidency, Poona, and Scinde, and an increase in the other Divisions. The Scinde Division furnished the highest proportion of admissions for dysentery and diarrhoea, and the lowest for hepatitis; and the Presidency Division the lowest for dysentery and the highest for hepatitis.

Diseases of the Urinary System.—There was a decrease in the prevalence of these diseases in all but the Mhow Division, where there was an increase. The latter was due to the prevalence of gonorrhoea at all the stations, but particularly at Neemuch; in the D Battery 18th Brigade Royal Artillery at that station, the admissions for gonorrhoea were 299 per 1,000 of mean strength.

CONDITIONS, &c.—There was an increase in the proportion of cases admitted under the head of *general debility*, usually the result of malarious fever or of length of residence in a tropical climate, in all the Military Divisions except the Scinde; in it a very marked reduction took place from the high ratio of the preceding year.

INJURIES.—There was an increase in the admissions by accidental injuries in all the Divisions except Aden, when the ratio amounted only to 40 per 1,000.

The admissions and deaths and invaliding in each Corps serving in the Command during the year were as follows:—

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
CAVALRY.								
3rd Hussars ..	491	610	6	..	6	1242·3	12·22	Ahmednuggur 12
15th „ ..	488	931	5	..	5	1927·5	10·35	Mhow 12
Total Cavalry.	974	1,541	11	..	11	1582·1	11·29	
ROYAL ARTILLERY.								
D Brigade R.H.A.	329	559	2	..	2	1699·0	6·08	Batt. C, Ahmednuggur 12 E, Mhow 12
Late E Brigade ..	45	32	1	..	1	711·1	22·22	C, Hydrabad 2 D, On march 1 Kirkee 1 Embarked for England.
6th Brigade R. A.	465	531	7	..	7	1111·9	15·05	No. 1, Mhow 12 Nos. 2 and 3, Aden 1 On passage 1 Colaba 10 Nos. 4 and 5, Colaba 1 On passage 1 Aden 10 Nos. 5 and 6, Colaba 12
9th Brigade R. A.	561	1095	15	..	15	1951·8	26·74	B, Kirkee 12 D, Nusseerabad 12 E, En route 2 Deesa 9 F, Ahmedabad 12
18th Brigade R.A.	881	1313	11	1	12	1490·3	13·62	A, On march 1 Ahmedabad 11 B, Kurtachec 12 C, Belgaum 11 On march 1 D, On march 1 Neemuch 11 E, Kirkee 12 F, Neemuch 1 On march 2 Kirkee 9
Total Artillery..	2281	3580	36	1	37	1547·5	16·22	

Bombay.

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
INFANTRY.								
1st Bn. 2nd Foot	891	718	8	..	8	805·8	8·98	Months. On march Belgaum 11½
1st „ 8th „	872	2098	14	1	15	2405·9	17·20	Nusseerabad, with Detachment at Neemuch. 12
49th Foot ..	906	1155	15	..	15	1274·8	16·56	Poona, with Detachments at Sattara, Colaba, and Asseerghur 11½
56th „ ..	600	1371	4	..	4	2285·0	6·65	On march Mhow 11½ Arrived from England. 8½
59th „ ..	927	1680	12	2	14	1812·2	15·10	Poona 11½ Mhow, with Det. at Indore and Neemuch 11½
3rd Bn. 60th Foot	50	63	..	..	..	1260·0	..	On march En route to Aden Aden 11½
66th Foot ..	912	1461	15	..	15	1601·9	16·45	Kurrachee with Detachment at Hyderabad 12
83rd „ ..	909	829	10	..	10	912·0	11·00	Poona 12
108th „ ..	900	1251	20	..	20	1390·0	22·22	On march Deesa, with Det. at Mount Abou Aden 11½
3rd Bn. Rifle Brig.	586	536	5	2	7	914·7	11·94	Embarked for England. 11½
Total Infantry..	7,553	11,162	103	5	108	1477·8	14·30	

The ratio of admissions into hospital was highest in the Cavalry and lowest in the Infantry; that of the deaths was highest in the Artillery and lowest in the Cavalry. The high ratio of admissions in the Cavalry was owing chiefly to the prevalence of ague in the 15th Hussars, at Mhow, but the mortality in it was lower than in the 3rd Hussars, indeed it was lower than in any Corps in the Command, with the exception of the 56th Regiment.

In the Royal Artillery the ratio of admission and deaths was highest in the 9th Brigade; that of admissions was lowest in the 6th Brigade, and of deaths in the Royal Horse Artillery.

In the Infantry the 1st Battalion 8th Regiment, at Nusseerabad and Neemuch, had the highest ratio of admissions, the great excess being due to ague, syphilis, and gonorrhoea; the 83rd Regiment at Poona furnished the lowest ratio, but it differed very slightly from that of the 3rd Battalion Rifle Brigade at Aden. The highest ratio of deaths was in the 108th Regiment at Deesa, and the lowest in the 56th Regiment, which arrived at Poona from England in the beginning of April; this Corps, though furnishing a very low ratio of mortality, had a very high proportion of admissions into hospital, standing in this respect next to the 1st Battalion 8th Regiment; the high ratio of admissions in it was caused by the prevalence of simple continued fever.

SANITARY REPORT.

Bombay.

Deputy Surgeon-General O'Flaherty, C.B., reports as follows:—

Barracks.—Some of the new barracks which were in course of construction were completed during the year, and taken into occupation by the troops. Two of these were occupied by the C Battery, D Brigade, Royal Horse Artillery at Ahmednuggur in May, a third being still in course of construction, so that the original plan of the men using the upper rooms only as dormitories could not be carried out. The lower rooms, as in similar buildings, are only intended for day rooms, dining rooms, and libraries. These new barracks are paved with stone throughout, the upper sleeping rooms having a wooden roof with ridge ventilation, in addition to that afforded by the doors and windows, and the lower rooms are ventilated by shafts leading to the roof, which run through the entire height of the building. One newly-finished upper-storied building for the Infantry at Mhow, was also occupied by the 59th Regiment in September, and two new double-storied barracks, on the standard plan, were taken over by the 15th Hussars at the same station, one in March and the other in December. The results of thermometrical observations show that the upper stories are not quite so cool as the lower stories during the day, and that the latter are warmer at night. From the lower stories, as a rule, a greater number of fever cases have been admitted.

Accommodation and Ventilation.—The accommodation during the year has been nearly always in accordance with regulation as regards cubic and superficial space, and it was frequently in excess of it. The ventilation was also generally sufficient, with one or two exceptions, as in the Artillery Barracks at Kurrachee, where there is no ridge or roof ventilation of any kind, and it is effected by means of doors and windows only. These defects are under the consideration of the authorities, but no steps have yet been taken to rectify them. The old barracks for the Royal Artillery at Ahmedabad have been previously reported to be indifferent, both as regards size and construction, and scarcely fit for Europeans at a station where hot winds prevail and close nights; but it is stated that new barracks will be built when funds are available. The quarters for the married men of the Royal Artillery and Infantry Detachment at Colaba have long been considered behind the sanitary requirements of the day; they are extremely defective in accommodation, small, imperfectly ventilated by doors and windows, and very slightly in the ridge through cowls; the floors are of mud, and, taking the climate of Bombay into consideration, are very unsuitable for a European with his wife and children.

Flooring.—It was intended that the experiment of asphaltting the floors in the sanitarium hospital at Colaba should be tried during the past year, and one of the wards was handed over to the Executive Engineer for that purpose, but the intention was not carried into effect, and the mud floors still remain, one of the wards being so damp as to be unfit for occupation. The Sanitarium Barracks at Colaba, and four of the seven barracks for the Artillery and Infantry Detachment, as well as the Married Quarters, have also mud floors. At Ghizree Sanitarium and Deesa the floors of the barracks are still of earth, and the only station at which any improvement has been effected is Sattara, where the floor of the hospital was recently flagged.

Lighting.—Complaints are very general at some stations, as at Colaba, regarding the inadequacy of the lighting provided by Government, which consists of cocoanut oil lamps, affording a very insufficient amount of light. If gas cannot be laid on, kerosine lamps ought to be substituted for them.

Charcoal Fires.—Charcoal fires have been allowed for the rainy season, according to the following scale, viz., two fires for every 10 men at Bombay, Belgaum, Poorundhur, Asseerghur, Aboo, and Deolalee, and one fire at all other stations, 10 lbs. of charcoal per diem being allowed for each fire, and burnt in iron segreia. Firewood, however, ought to be allowed as formerly for Hill stations, such as Poorundhur, and the allowance of charcoal, substituted during the monsoon season of 1871, has proved to be quite inadequate: the Medical Officer in charge remarks that nine invalids remained on the hill during the last wet season, and that owing to the imperfect means of keeping them warm and dry, they declined in health rather than otherwise.

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Bombay.

Guard-rooms and Cells.—The cells at Hyderabad were so hot as to require tatties and punkahs to render them fit for occupation. The guard-rooms have generally had sufficient cubic and superficial space for the number of occupants.

Conservancy.—There have been no complaints regarding conservancy, the dry-earth system being carried out at all stations and proving most efficient, and disinfecting powder being seldom required in addition. The disposal of the refuse at Asseerghur continues unremedied, and it is still tilted off the scarp of the rock from a platform and allowed to remain unburied below; a latrine for natives is also reported to be situated to windward of the barracks for the European Infantry Detachment. Both of those sanitary defects were brought to the notice of the Military Authorities by the Deputy Inspector-General of the Mhow Circle, who recommended that the refuse should be either burnt or buried.

Latrine accommodation for hospital servants and others at Colaba is still extremely defective.

Ablutionary Arrangements.—These have been satisfactory as regards water supply; but the order allowing a separate basin for each man in barrack has been cancelled, and from the reports of Medical Officers the number now issued is quite insufficient; thus, in the 3rd Hussars at Ahmednuggur, only 20 basins have been allowed to a troop, and four to the families, or in the proportion of one basin to every three or four families, instead of one to each. Many of the lavatories are very defective, as at Poorundhur, where there is only one small bath room containing three half casks for tubs, and this, with a small lavatory with basins attached to two of the three barracks occupied by the troops, constitutes all the bathing accommodation for the troops on the hill, where a suitable bath room for at least 120 men is urgently required. It would be an improvement if lavatories were partitioned off, each partition being provided with a seat, pegs for clothes, and a basin on a ledge, and the trough placed so that a man could conveniently take out water and pour it over himself; this arrangement would allow the soldier to enjoy as perfect and private ablution as his officer.

Sanitary Condition of vicinity of Stations.—The native bazaar which was erected opposite Colaba sanitarium, adverted to in last year's report, remains as before, and the sanitary condition of Colaba generally is extremely bad, chiefly from the insufficiency of latrine accommodation for natives. From the same cause the sanitary condition of the vicinity of the barracks at Poorundhur is unfavourably reported upon, and that of Abcoo sanitarium was so bad that the occurrence of two cases of typhoid fever, among the children of the Lawrence Asylum, was justly attributed to the want of proper conservancy arrangements.

Rations.—There has been no change in the composition of the rations during the year, and they have usually been extremely good and sufficient for the maintenance of health. A question was referred to Inspector-General Mouat, C.B., in May 1871, by the Adjutant-General of the Army, regarding the necessity for a second issue of mutton weekly for the troops. Mr. Mouat replied that, taking into account the effect of a tropical climate in rendering the appetite capricious, it was even of more importance to vary the ration in India than at home, that the food of the soldier in India was of vital importance, affecting both his health and efficiency, and that he would strongly urge the necessity, on sanitary grounds, of continuing the issue of mutton twice a week at all stations throughout the year. This recommendation was acted on, and is doubtless of much efficacy in maintaining the troops in good health, and enabling them to withstand the effects of the climate. Very few complaints have been made respecting the rations, almost the only one being that the potatoes issued at Nusseerabad are very small and inferior, a defect which the Medical Officer, who reports on the matter, thinks might be remedied by better commissariat arrangements, as there is a good road to Agra, where good potatoes are procurable. A proposition was made in a Government Resolution, dated 3rd March, 1871, to reduce the potato ration at Aden from 12 to 8 ounces, in consequence of the difficulty of obtaining vegetables at that station. The matter was referred to Inspector-General Mouat, who objected to it, pointing out that in all probability an issue of lime juice would

be required to counteract the possible effects of the limited potato ration in producing scurvy, which was prevalent at Aden in 1866, when only 8 ounces of potatoes were allowed in the 109th Regiment as a daily ration, and disappeared when it was increased to 12 ounces.

Australian preserved beef was issued to the troops at Abou and some other stations, but it proved so insipid and unpalatable that its use was discontinued. Beef is reported as very inferior at Aden, and mutton is the only meat ration issued at Abou, except once a week, when fresh or salt pork is substituted, the slaughter of cattle not being permitted as in other parts of Rajpootana.

Water Supply.—There has been no change in the supply of water during the year. At most stations it has been reported good and abundant, except at Kurrachee and Nusseerabad, where it is brackish from the presence of chloride of sodium and other salts. At Nusseerabad, however, good water is obtainable from Dilwarra, a village about three miles distant, and at Kurrachee tolerably pure water is obtained from a well which is under the supervision of the Commissariat.

At Aden condensed water (filtered) is used for drinking purposes. The silicated charcoal filters are not liked by the men so much as the rough method of filtration through sand and charcoal, as they find the water is not cooled by them so much, and the process is slower; but they must necessarily possess superior purifying power to the chatties, which are cumbersome and inefficient, unless great care be taken in preparing them and in the supervision of the water carriers, who frequently evade the order to pour the water from their mussacks into the uppermost vessel, and pour it into the lowest, this being much the easier proceeding.

Supply of Ice.—The ice machines supplied to the Infantry Hospitals at Deesa and Nusseerabad were in operation during the hot season of 1871, and from the reports of the Medical Officers under whose charge they were placed, they appear to be very efficient, turning out a block of ice daily between three and four pounds in weight.

Clothing and Bedding.—The clothing for the Infantry may be considered adapted to the climate, and serge should invariably be worn, except for mounted duties, when cloth trousers are more economical. At present during the cold season a serge tunic is supplied to the Foot Artillery, but it would be more suitable to the climate if serge trousers were substituted for cloth, which as a rule is much too hot. In the 3rd Hussars serge tunics were about to be issued, but in the 15th Hussars the materials for the coat and trousers are the same as at home, and perfectly unsuited for India. The bedding has been generally considered sufficient, and well adapted to the climate.

Venereal Diseases.—There was a decrease of venereal diseases in the aggregate in 1871, compared with the previous year.

Section II.

On the Extent of Invaliding.

During the year there were 2,211 invalids sent home from India, and 913 finally discharged the service at Netley, being respectively in the ratio of 38.51, and 16.02 per 1,000 of mean strength, both much lower than in the preceding year. The decrease was most marked in the Madras Presidency, but was also considerable in Bombay; in the Bengal Presidency it scarcely amounted to 3 per 1,000. The numbers sent home from Bengal were 1,664, from Madras 301, and from Bombay 246 men.

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India.

India.

The disabilities of the invalids are stated in detail in Abstract No. 18 in the Appendix, of which the following is a classified summary :—

Station	Invalids sent home from			Invalids from India discharged the service at Netley.
	Bengal.	Madras.	Bombay.	
Mean Strength	35,452	10,684	10,838	56,974
Continued Fevers	2	..	2	..
Paroxysmal „	112	1	26	56
Erysipelas .. ..	..	..	1	1
Rheumatism	104	11	9	33
Syphilis	99	27	16	51
Scrofula and Phthisis ..	125	32	20	201
Anæmia	134	8	12	30
Other Constitutional Diseases	6	..	..	3
Diseases of the—				
Nervous system	91	25	17	31
Eye	22	2	6	23
Ear	15	2	1	17
Nose .. ..	..	1	..	..
Circulatory system ..	164	14	24	145
Absorbent „	1	..	..	..
Ductless Glands .. ..	..	..	..	1
Respiratory „	44	15	14	38
Digestive „	383	98	49	174
Urinary „	22	2	3	10
Generative „	5	1	1	7
Organs of Locomotion ..	22	2	7	18
Cellular Tissue	1	..	..	2
Cutaneous system	15	3	1	14
Debility	277	52	27	36
Accidental Injuries	17	5	9	18
Homicidal „	1	..	..	..
Surgical Operations	2	..	1	4
Total	1,664	301	246	913
Ratio per 1,000 of { 1871	46·93	28·17	22·70	16·02
mean Strength { 1861-70	40·14	39·28	34·40	19·61

The invaliding from Bengal in 1871 was above, and from the other two Presidencies considerably under the average of the preceding ten years. In all of them diseases of the digestive system were the most frequent cause of disability, and next to these paroxysmal fevers, with their consequent anæmia, and debility. Scrofula and phthisis and diseases of the circulatory system occupy prominent places as causes both of invaliding to England and of final discharge.

Section III.

Mean Daily Sick.

The average number of men constantly non-effective from sickness during the year 1871 was :—in Bengal 2,061, in Madras 601, and in Bombay 568. The results calculated from these numbers are shown in the following Table :—

	Bengal.		Madras.		Bombay.	
	1871.	1861-70.	1871.	1861-70.	1871.	1861-70.
Ratio per 1,000 constantly Sick ..	58·13	61·10	56·25	62·79	52·41	60·58
Average Sick Time to each Soldier .	Days. 21·22	Days. 22·30	Days. 20·53	Days. 22·92	Days. 22·50	Days. 22·11
Average Duration of Cases ..	14·32	13·64	16·90	16·72	15·02	14·93

Compared with the results of the preceding year this Table shows a slight increase in the mean daily sick in Bengal, and a decrease in the other two Presidencies, most marked in Bombay. There has been a decrease in the average sick time to each soldier and in the duration of the cases in Madras, but an increase in Bengal and Bombay, the increase being greater in the latter as regards the sick time to each man, and in the former in the average duration of the cases.

Section IV.

On the Influence of Age on the Mortality.

In Abstract No. 19 in the Appendix, the details are given of the strength and deaths at different ages of the troops serving in India in 1871. The following Table shows the results, and also the average of the ten preceding years :—

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	Under 20 years.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.	
	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.
Bengal	2,261	22	9,249	114	9,068	134	7,411	185	2,798	109	384	25
Madras	1,232	6	2,398	31	2,421	48	1,961	81	675	34	109	13
Bombay	1,003	7	3,603	35	2,553	34	1,844	38	834	33	120	4
Total	4,496	35	15,250	180	14,042	216	11,216	304	4,292	176	613	43
Ratio of Deaths per 1,000 of Strength	7.78		11.80		15.88		27.10		41.01		68.51	
Ditto 1861-70	9.10		17.58		24.25		33.74		44.20		61.08	

This Table shows a less rapid increase in the mortality with the advance of age than the results for 1870, and considerably less than the average of the last ten years ; but above the age of 30 it is still very striking, and greatly in excess of what is observed at home or among our troops in temperate climates.

XV.—ON THE HEALTH OF TROOPS ON BOARD SHIP.

STATISTICAL REPORT.

The Troops embarked during the year, as shown by the Ship Returns, *Troops on Board Ship.*
were as follows :—

I. Troops or drafts proceeding on foreign service	....	11,451
II. Do. returning from foreign service	....	5,670
III. Do. passing by sea from one Colony to another, or from one station in a Military Command to another	.... .... ....	2,979
IV. Invalids and "time-expired men" returning to England	.... .... ....	2,627

In the last group are included 193 time-expired men, and 94 effective soldiers embarked with the invalids whom it has been found impossible to separate from the latter. The rest of the time-expired men are included in the second group.

I. TROOPS PROCEEDING ON FOREIGN SERVICE.

The 11,451 men, shown by the Ship Returns to have embarked for foreign service, represent an average annual strength of 1,170. The admissions on the sick list during the voyages amounted to 631, and the deaths to four, being respectively in the ratio of 539 and 3·42 per 1,000 of mean strength.

The diseases by which the sickness and mortality were caused are detailed in Abstract No. 20 in the Appendix, from which the following classified summary has been prepared :—

Troops on Board Ship.

Order.	Stations				To the Mediterranean, America, the Cape, Ceylon, and Japan.				To India, <i>via</i> Egypt.			
	Number of men Embarked				2,185				9,268			
	Average Annual Strength				245				925			
	Diseases.				Ratio per 1,000				Ratio per 1,000			
					Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	I. General Diseases.											
1	Febrile Group				7..	28·6	..	44	1	47·5	1·08	
2	Constitutional „				22..	89·8	..	132	1	142·7	1·08	
	II. Local Diseases.											
	Diseases of the—											
1	Nervous System				5..	20·4	..	8	1	8·6	1·08	
2	Eye				1..	4·1	..	16..		17·3	..	
3	Ear .. ..				..	..	..	1..		1·1	..	
5	Circulatory System .. ..				..	..	..	1..		1·1	..	
6	Absorbent „				2..	8·2	..	10..		10·8	..	
8	Respiratory „				1..	4·1	..	44	1	47·6	1·08	
9	Digestive „				20..	81·6	..	53..		57·3	..	
10	Urinary „				24..	97·9	..	103..		111·3	..	
11	Generative „				1..	4·1	..	6..		6·5	..	
12	Organs of Locomotion				1..	4·1	..	2..		2·2	..	
13	Cellular Tissue				6..	24·5	..	11..		11·9	..	
14	Cutaneous System				10..	40·8	..	47..		50·8	..	
	III. Conditions, &c.											
	Debility .. ..				..	..	..	1..		1·1	..	
	V. Injuries.											
2	Accidental.. ..				8..	32·6	..	44..		47·6	..	
	Total				108..	440·8	..	523		4565	44·32	

There was no great amount of sickness in either of these groups. Among the troops proceeding to India, scarlet fever caused six admissions on board the "Crocodile" on its first voyage, and eight on its second voyage from Queenstown to Alexandria; and five admissions with one death on board the "Jumna" from Portsmouth to Bombay. On board the "Crocodile" in its last voyage during the year from Queenstown to Bombay, 47 cases of syphilis, and 40 of gonorrhœa were admitted; the diseases are stated to have been contracted in Dublin; and on board the "Malabar," also from Queenstown to Bombay, there were 25 cases of syphilis and five of gonorrhœa, contracted at Cork prior to embarkation. No other diseases prevailed to such an extent in any of the ships as to require special notice.

II. TROOPS RETURNING FROM FOREIGN SERVICE.

The Ship Returns account for 5,670 men, representing an average annual strength of 567. There were 308 cases of sickness among them and 12 deaths, being respectively in the ratio of 543, and 21·16 per 1,000 of mean annual strength, both higher than in the preceding year.

The following Table, framed from Abstract No. 20 in the Appendix, shows the admissions and deaths by the different classes of diseases :—

Troops on Board Ship.

Stations.. .. .					From Mediter- ranean, Mauritius, Cape, and British America.				From India, <i>vid</i> Egypt.			
No. of men embarked					1,210				4,460			
Average <i>Annual</i> Strength					152				415			
Order.	Diseases.				Admitted.	Died.	Ratio per 1,000.		Admitted.	Died.	Ratio per 1,000.	
							Admitted.	Died.			Admitted.	Died.
I. <i>General Diseases.</i>												
1	Febrile Group	4	26.3	56	1	134.9	2.40					
2	Constitutional „	10	65.8	48	2	115.7	4.80					
II. <i>Local Diseases.</i>												
Diseases of the—												
	Nervous System	1	5	32.9	9	21.7	..					
1	Eye	5	32.9	9	21.7	..						
2	Circulatory System	1	6.6	6.58	..	..	..		
5	Absorbent „	3	..	..	3	7.2	..			
6	Respiratory „	10	65.8	16	1	38.6	2.40					
8	Digestive „	7	46.0	45	5	108.4	12.10					
9	Urinary „	6	39.5	14	..	33.7	..					
10	Generative „	1	6.6	4	..	9.6	..					
11	Organs of Locomotion .. .. .	..	..	1	..	2.4	..			
12	Cellular Tissue.. .. .	4	26.8	7	..	16.9	..					
13	Cutaneous System	14	92.1	15	..	36.1	..					
14												
III. <i>Conditions, &c.</i>												
	Debility	3	19.7	2	..	4.8	..					
IV. <i>Poisons</i>												
	.. .. .	1	6.6	6.58	..	..	..		
V. <i>Injuries.</i>												
2	Accidental	11	72.4	10	..	24.2	..					
	Total	77	506.6	19.74	231	955.6	21.70					

There was no remarkable prevalence of disease among the troops returning from foreign service. The 79th Regiment, in the "Jumna" from Bombay, had rather a high proportion of cases of ague. The ratio of mortality was higher among the men returning from other stations, but lower among those from India than in 1870. Among the latter five of the nine deaths were by diseases of the digestive system. No cases of cholera occurred.

III. TROOPS PROCEEDING FROM ONE COLONY OR STATION TO ANOTHER.

In this group there were included in the Returns 2,781 white and 198 black troops embarked as effectives, representing respectively an average annual strength of 186 and 24. Among the former there were 193 admissions and three deaths, being in the ratio of 1,038 and 16.14 per 1,000 of mean annual strength; among the black troops there were only six admissions recorded, giving the ratio of 250 per 1,000.

Troops on Board Ship.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. 20 in the Appendix; the classified results are shown in the following Table:—

		White Troops.				Black Troops.			
Strength Embarked		2,781		Ratio per 1,000		198		Ratio per 1,000.	
Average Annual Strength ..		186		1,000		24		1,000.	
Order.	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. General Diseases.									
1	Febrile Group	75	..	403·2	..	..	..	..	..
2	Constitutional „ ..	34	..	182·8	..	4	..	166·6	..
II. Local Diseases.									
Diseases of the—									
1	Nervous system	6	1	32·3	5·38	..	..	..	..
6	Absorbent System	2	..	10·7	..	..	..	..	..
8	Respiratory „	9	..	43·4	..	..	..	..	..
9	Digestive „	29	1	155·9	5·38	..	..	..	..
10	Urinary „	14	..	75·3	..	1	..	41·7	..
11	Generative „	2	..	10·7	..	..	..	..	..
18	Cellular Tissue	6	..	32·3	..	..	..	..	..
14	Cutaneous System	8	..	43·0	..	1	..	41·7	..
III. Conditions, &c.									
	Debility	1	..	5·4	..	..	..	..	..
IV. Poisons									
	.. ..	3	1	16·1	5·38	..	..	..	..
V. Injuries.									
2	Accidental	4	..	21·5	..	..	..	..	..
	Total	193	3	1037·6	16·14	6	..	250·0	..

The ratio of admissions by the febrile group of general diseases among the white troops was very high from the occurrence of 65 cases of remittent fever among the men of the 75th Regiment, on board the “Tamar,” from Hong Kong to the Cape; the disease was the result of previous service at Hong Kong and Singapore. The admissions by syphilis and gonorrhœa were also high in the 1st Battalion 10th Regiment, proceeding from Yokohama to Hong Kong.

IV. INVALIDS, &c., RETURNING TO ENGLAND.

The number of European troops comprised in this section were 2,340 invalids, 193 time-expired men, and 94 effectives, making a total of 2,627, and representing an average annual strength of 329 men. There were 257 of these embarked sick; 321 cases were placed on the sick list during the voyage, and 34 men died, all the latter being invalids with the exception of one time-expired man, who died of laryngitis on board the “Crocodile,” on his passage from India. These deaths have as usual been added to those of the various Commands from which the men were invalided.

There were 64 men of the Ceylon Rifles embarked as invalids at Labuan to return to Ceylon; of these nine died on the passage, all of them from Beri-Beri, and included in the Abstract of Sickness and Mortality at Labuan.

SUMMARY.

The following Table shows the principal results relative to the health of the Army at home and abroad in 1871, and the average of the ten preceding years:—

Summary.

		Annual Ratio per 1,000 of Mean Strength.									
		1871.					1861-70.				
		Admitted into Hospital.	Died.	Sent Home as Invalids.	Discharged as Invalids.	Constantly Non-effective from Sickness.	Admitted into Hospital.	Died.	Sent Home as Invalids.	Discharged as Invalids.	Constantly Non-effective from Sickness.
WHITE TROOPS.											
United Kingdom ..	..	816	8·62	..	18·9	38·78	913	9·45	..	38·8	46·01
Gibraltar and Malta ..	..	694	9·25	30·6	18·4	31·79	765	11·00	35·8	18·8	40·15
Dominion of Canada ..	..	680	7·55	17·6	15·5	33·15	647	9·01	15·9	12·8	30·36
Bermudas ..	..	670	17·88	26·0	16·2	31·16	764	29·02	40·6	18·2	39·54
West Indies ..	..	764	6·21	16·6	16·6	33·13	1,051	15·99	39·8	17·5	45·30
St. Helena and Cape ..	..	991	10·51	17·8	12·9	43·69	995	10·77	39·7	22·2	50·61
Mauritius ..	..	1,000	14·75	12·6	2·1	42·10	1,056	20·17	41·5	17·3	45·13
Ceylon ..	..	1,163	12·32	62·6	30·8	54·41	1,395	24·00	42·1	23·6	64·80
South China, Japan, and Straits Settlements ..	..	1,482	18·22	55·8	52·0	64·10	1,726	33·66	46·8	22·5	80·79
India ..	..	1,434	18·73	38·8	16·0	56·69	1,559	26·73	41·1	19·6	61·39
On board Ship ..	..	642	8·40	..	..	..	693	12·94	..	..	..
Total ..	..	1,020	12·08	36·4	17·9	44·28	1,115	16·17	35·4	24·8	50·42
COLONIAL CORPS.											
Malta ..	..	808	5·31	..	..	..	851	8·88	..	..	..
West Indies ..	..	900	27·08	..	..	{ 48·11	1,032	22·66	..	17·8 {	48·11
Western Africa ..	..	1,053	15·63	..	6·8	{ 76·25	1,233	22·49	..	*20·0	76·25
Ceylon and Labuan ..	..	727	29·50	..	83·15	*34·20	*378	*14·98	..	..	*34·20
South China and Straits Settlements ..	..	1,468	11·52	..	+42·73	+42·73	+1,112	+23·32	+31·3	..	+46·14
On board Ship ..	..	260	..	..	..	..	1,030	23·11	..	..	..
Total ..	..	1,038	16·88	..	..	..	1,041	22·08	..	..	..

* Ceylon only.

+ China only.

Summary.

The admissions and deaths have been considerably under the proportion in 1870, and show a still more marked reduction compared with the average of the last ten years. The only stations at which there was an increase in the mortality, compared with 1870, were those in the Mediterranean, the Bermudas, and South China, Japan, and the Straits Settlements; in all the others there was a reduction, but most marked in India, Ceylon, and among troops on board ship.

A P P E N D I X.

APPENDIX No. I.

REPORT ON HYGIENE FOR THE YEAR 1872.

By E. A. PARKES, M.D., F.R.S., Professor of Hygiene in the Army Medical School.

THE 2nd half of the first volume of the great work on Military Hygiene,* by Roth and Lex, has appeared, and includes the subjects of dwellings, removal of excreta, disinfection, and military buildings. The work maintains the high standard of the first part, and is a complete treatise on each of the subjects. The chapter on removal of excreta by Roth, and on disinfection by Lex, are both admirable.

Dr. C. Gordon has published† a work which is principally based on his observations during the late Franco-Prussian War; as he was present in Paris during the whole siege he had unusual opportunities of observing many points of interest.

A German Military Medical Journal‡ was commenced in 1872, and is published every month. It deals largely in military surgery, as the late war furnished so much material, but also contains notices of all military hygienic points of interest, and various other matters connected with the German Army.

Among the numerous publications which the great war of 1870 has produced, the work of Grellois on the siege of Metz§ deserves special notice. He gives apparently an unbiassed picture of the sufferings of the siege, and of the causes which led to them. Metz was as ill-provided with medicines and hospital stores as with warlike material and food; the most important medicines were exhausted soon after the siege began, and the French had to request permission from the Germans to introduce chloroform. Instruments were also wanting, and men were lost in consequence, although requisitions had been sent in for everything. But here as elsewhere, either from incompetence or neglect, the intendance had utterly broken down, and as an instance of the blind adherence to mere form, it is mentioned that malt was offered by a brewer, and when the medical officers wished to use it for ptisans, it was not permitted, because malt is not in the formulary of the hospitals (p. 95). In Metz, from the 15th August to December 1870, there died 2,851 from wounds; 726 from diarrhoea and dysentery; 1,364 from typhoid fever; 176 from small-pox; 177 from continued fever, and 81 from pneumonia, out of 43,000 admitted into hospital. The total loss of killed, wounded, and disappeared in the battles of Borny, Gravelotte, and St. Privat (14th, 16th, and 18th August), was 1,585 officers and 38,383 men. With reference to the particular kind of fever in Metz, it

* "Handbuch der Militär-Gesundheitspflege." Von Dr. W. Roth und Dr. R. Lex. Band I. Zweite Lieferung. Berlin, 1872.

† "Lessons in Hygiene and Surgery." By C. A. Gordon, M.D., C.B., Deputy Inspector-General of Hospitals. London, 1873.

‡ "Deutsche Militär-ärztliche Zeitschrift." Berlin, 1872. Band I.

§ "Histoire Médicale du Blocus de Metz." Par D. Grillois, ex-Médecin en chef des hôpitaux. Paris, 1872.

may be noticed that an important argument against the production of exanthematic typhus from simple overcrowding, has been drawn from the experience both of Metz and Paris. In both places during the sieges there was overcrowding, wretchedness, and famine, particularly at Metz, yet as pointed out by Professor Chauffard to the Académie de Médecine, there was scarcely any or no typhus, as there had been in the wars of the First Napoleon. There was typhus in the German besieging force, but so strict was the blockade that it was not imported into Metz, and was not generated there. Although Grellois believes in the identity of typhus and enteric fever, and thinks that there was some typhus mixed up with the common typhoid form (as he considers it), he is obliged to admit that few cases of typhus were seen, and if the disease really existed it disappeared, for at the end of the siege he owns there was no typhus (p. 50). The Franco-Prussian war has had one curious effect on French Military literature. Astonished by the failure of their army, and by its evident inferiority to the German, the French have turned with ardour to the discovery of the causes of their unsuccess. They are evidently now seeing that it is safer to magnify shortcomings than to conceal them, and that the explanation of failure which is most pleasing to one's self-love is not generally the right one. Their military writers are turning back to the ancients, and especially to the greatest military nation the earth has seen, for lessons in war, and are seeking in the records of old Rome the precepts of discipline, foresight, and unwearied preparation, which are to regenerate the humbled power of France. This tendency is evident in both branches of the service. M. Gaudree-Boilleau, of the French War Department, has written a military work,* which goes back to the Trojan War in its search for warlike rules, and Dr. Lamarre,† in his recent edition, has given a still better account of the Roman system. In military medicine the tendency is the same; the "Revue des Médecins des Armées,"‡ enters at length into all that is known of the medical service of the Roman Army. A searching examination is being made also into the aptitude of the young French population to bear arms, and the result is considered to be more favourable than was expected. Dr. Morache in a very able treatise on recruiting,§ gives reasons for believing that the French race is not degenerating; that it is on the contrary improving in physical power, and that it can furnish soldiers sufficient in number for the defence of the honour and independence of France. Morache considers that 1,000 young men will now give 580 good soldiers; 70 will have defect of stature, and 350 will be unfit from infirmity.

By the law of the 27th July, 1872, the minimum stature for the French Army is 1 metre 540 (= 60·64 inches, which is nearly 5 inches below the French infantry minimum of 1792, when the grand levy was made). But the mean height is much above this. In 1836 the mean height of those taken at the conscription was 1 metre 6499 (= 64·958 inches), and in 1864 it was 1 metre 6486 (= 64·906 inches), so that the mean height had not lessened in 28 years. And on comparing the conscription in France with Prussia, the rate of exemption for physical inaptitude (defect of stature and infirmity) is only 35·16 per cent., while in Prussia it is 47·40 per cent.

At the same time Morache points out that there are various points in which France presents some striking and unfavourable contrasts to Prussia. The population of France doubles itself in 108 years; that of Prussia in 54. This is not owing to increased mortality, for the yearly mortality of France is 23·1, and that of Prussia is 26·1 per 1,000 of population. It is owing, as is well known, to differences in the birth-rate; in France there is one birth to 37·4 inhabitants, in Prussia 1 to 26·5. The following table from Morache gives the facts in another form: 100 women, aged 15 years and upwards have the following number of children:—

* "L'Administration Militaire dans l'Antiquité." Par A. Gaudree-Boilleau (Ancien Chef de Bureau du Ministère de la Guerre. Paris, 1871.

† "De la Milice Romaine." Par Cl. Lamarre. Second Edition. Paris, 1870.

‡ "Le Service de Santé des Armées dans l'Antiquité." Par Le Dr. J. M. Guardée. *Revue des Médecins des Armées*. Jan., Mai, 1872.

§ "Considérations sur le Recrutement de l'Armée." Par M. Le Dr. Morache, Professeur agrégé au Val-de-Grâce. Paris, 1873.

France	....	....	....	....	12-26
Department of the Seine	....	....	....	....	10-06
Paris	....	....	....	....	10-47
England	....	....	....	....	20-02
Belgium	....	....	....	....	18-03
Holland	....	....	....	....	21-00
Saxony	....	....	....	....	20-00
Denmark	....	....	....	....	19-09
Bavaria	....	....	....	....	18-02

The causes of the deficient birth-rate in France are too well known, but Morache again enumerates them.

"The development of the public wealth, which has for a direct effect the "increase of the mean duration of life, and the continually increasing luxury, "have established in France the deplorable habit of limiting the number of "children in marriage; in vain morality and religion seek to combat these pernicious ideas, they appear to augment every year; they tend especially to "gain the rural populations, who seem no longer able to resist the contagious "example of the people of the towns. People marry late, because they wish to "have an established and well assured position, because they do not wish to "fall into poverty (*se mettre dans la misère*), and they desire to have few "children in order to leave to each a good patrimony. Certain philosophers "call this immorality 'paternal foresight,' without confessing that it leads to "the moral downfall of the family, and to the diminution of the population of "the country" (p. 67).

In these few sentences the causes arising from the laws of inheritance, and from the too great yearning for material comforts and luxuries are clearly shown, and make us fear that Morache is perhaps too sanguine in believing that the male population of France is improving in the qualities which render them fit for war, and that it is indeed time that they sought in the history of Roman writers for the lessons which alone can render them able to resist the pressure of the rapidly increasing, hardy, and educated population of Germany.

The various Sanitary Reports for 1871 from India are as usual of the highest interest. The Eighth Report of the Sanitary Commissioner with the Government of India (Dr. Cunningham), contains, in addition to his own able Report, the remarkable essays on cholera, by Dr. Lewis and D. D. Cunningham; Lewis' report on bladder worms, and on the *Filaria sanguinis hominis* which has attracted so much attention in Europe, and Dr. Bryden's very important analysis of the influence of age in the death and invaliding rate of the European soldier. Dr. Cornish's Madras Report for 1871, in addition to a valuable analysis of all the medical facts of the year, contains some important contribution to the history of cholera, to which reference is made further on. The Bombay Report for 1871 is especially rich in statistical tables of the population, and its distribution and mortality; there are also many meteorological tables and thermometrical observations in the upper and lower storeys of barracks, and an attempt to state the effect in admissions from fever and cholera of these two storeys. But the numbers are too few for any decision at present.

Dr. Fairweather's Sanitary Report of the Punjab for 1871 contains, among other interesting matter, an account of a localized outbreak of cholera at Delhi, the particulars of which are given further on.

Many civil sanitary works have been published, among which may be especially noticed a very useful treatise* by Dr. Wilson, which is intended for Civil Medical Officers of Health, and gives in short space an excellent summary of the subject, and account of the Sanitary Acts and Regulations. A smaller work has been published by Mr. Burn,† which also contains much good matter.

An elaborate work, on Air and Rain, by Dr. Angus Smith,‡ brings together and amplifies the numerous observations he has already published on these

* "A Handbook of Hygiene." By George Wilson, M.A., M.D. Ed. London, 1873.

† "Sanitary Science." By R. S. Burn. Glasgow, 1872.

‡ "Air and Rain." By A. Smith, Ph. D., F.R.S.

subjects. Mr. Amphlett Moss (Apothecary to the Forces) has published a very good paper on the amount of free and albuminoid ammonia in air.*

On the special subject of ozone in air, a work by Dr. Cornelius Fox† may be consulted with advantage, as giving not only a *resumé* of the observations already made on its nature and diffusion, but an account of the processes which have been used to determine its amount.

Papers on disinfection and on examinations of food have been very numerous, and a useful collection and analysis of almost all of them will be found in the Journal published by Hassall.‡

In the following Report I have found it necessary to go at considerable length into the subject of the spread of the specific diseases, and into the evidence brought forward during the year into the parasitic origin of disease. I have therefore been obliged to omit many other details, and to confine the Report to these two topics.

The following are the contents of this year's Report:—

1. Spread of the specific diseases :
 - Paroxysmal fevers.
 - Enteric fever.
 - Cholera.
 - Dengue.
 - Influenza of horses.
2. Parasitic origin of disease :
 - Entozoic diseases.
 - Fungoid diseases.
 - Bacteroid diseases.

SECTION I.

SPREAD OF THE SPECIFIC DISEASES.

Paroxysmal Fevers.

Marsh Fever produced by obstruction of the Outlets of Subsoil Water.

In reference to the vexed question of the Burdwan fever in Bengal, the following account by Dr. Derby,§ of Massachusetts, will be found of interest.

The uneven surface of Massachusetts has allowed great resort to water-power, and thus dams and reservoirs have been formed which obstruct flow, and have raised the water-level. The reservoir, also, which is often constructed to supply water for the wheel, is a receiver of many impurities, and purifies itself little by movement, or if the reservoir is emptied a foul bottom is exposed to the sun.

Formerly indigenous intermittents in Massachusetts were very rare, but when they occurred they were often referred to the milldams causing obstruction, and producing wet marshy soil.

In 1828 a dam thus constructed on the Housatonic caused such a development of intermittent fever that the people obtained legal authority to remove the dam, on the ground of the injury to public health.

At the present time the exemption from intermittent fever is far less complete than it was formerly.

"Twenty-five years it was taught in our medical schools," says Dr. Derby, "that intermittent fever was a disease almost unknown in Massachusetts, except when contracted in other places. . . . The exemption of the people of this State from periodic fever seems to be far less complete at the present time. Intermittents have been observed in Chelsea, and the history of the cases carefully investigated, and their local origin proved, on lands reclaimed from a salt marsh, and now covered with houses. Cases have been seen during the past year clearly originating in Boston. They have been reported of late years in various parts of the State, along the banks of streams in low lands, and also in the immediate vicinity of tide-water, and

* "Lancet," November, 1872.

† "Ozone and antozone," by C. B. Fox, M.D. Ed. London, 1873.

‡ "Food, Water, and Air."

§ "Third Report (1872) of the State Board of Health of Massachusetts." Boston, 1872. P. 63.

"occurring in persons who had never lived elsewhere. Physicians have also observed that in the treatment of typhoid or enteric fever, the number of cases in which quinine is found useful, not simply as a tonic but as a febrifuge, has become very considerable. In parts of Connecticut, intermittent and even remittent fevers are now not only frequent but severe; and the gradual enlargement of the area of malarious influence, from the latitude of Long Island Sound towards the southern border of Massachusetts, is a fact to which we may well give heed."

The cause of this extension is to a considerable extent fresh-water obstruction, and several examples are given; but there is, in addition, another form of water-obstruction, which, says Mr. Derby, "is full of danger to the public health, and is counterbalanced by no commensurate claims to economical value. If the fresh-water obstructions need to be watched, some of the salt-water obstructions need to be demolished. If the river dams and reservoirs are liable, when used for the single object of profit, to render public health less secure, the tide-mills in crowded neighbourhoods are nuisances which should be abated." (p. 67.)

The rise and fall of the tide has been used as a motive power in all convenient situations from the earliest settlement of the country. Of late years tide-mills have not been found profitable, but the dams remain, and in some cases their water-power is still used. When first formed there were seldom any houses near them, but now there is a crowded population close to them. In the case of the "Cross-dam" at Boston, about 70 acres were kept filled in 1871 by stagnant salt water, for the sake of the power thus obtained for a grist-mill. This affected the health and comfort of at least 200,000 persons, and drove many persons from their homes.

A case which occurred at Natal, and which was related to me by Dr. Cattell, of the 10th Hussars, gives another interesting instance of an accidental obstruction acting somewhat in the same way. I give Dr. Cattell's memorandum in his own words:—

Notes on an Outbreak of Remittent Fever at Natal, 1868-9.

"Fever of a severe and unusual type suddenly appeared along the coast northward of the Unguini River, and as a vessel had recently put into D'Urban from Port Louis, disabled with Mauritius fever, the sick crew being landed at the Civil Hospital, a panic induced the Government to send down a Commission of Inquiry.

"Along a line of some 5 miles, a low hill range encloses a narrow belt of lagoons, themselves separated seaward by a low spit of sand, often in mounds, held together by juniper and iceplant, and pervious below to the water. To the south this range abuts on the Unguini, a large river; here, as it meets the sandy shore, sinking through and becoming shallow, having therefore a variable mouth, which changes after great floods. Six months previously, before the present hot season, an unusual rainfall, over a wide area near its sources, had brought down a large volume of water, destroying the bridge and carrying trees, Kafir houses, much soil, and a large mass of canes, refuse, manure, &c., from its banks and the low adjoining plantations. Previously opening near the lagoons, the river had now cut southward along the sandy shore and opened 600 yards or more further down, so that the seaward boundary of the lagoons extended right across its former mouth. The flow, instead of being towards the lagoons, was now directly away, and these were therefore not overflowed as deeply as formerly. The entrance to them from the river was found closed almost entirely by masses of vegetable matter, trees, canes, and cane-field refuse, matted together to a depth of from 4 to 6 feet, lying always in the water, but now entirely submerged. All along the lagoons similar matter had been carried by the flow-water, and left partially submerged. Along the seaward face of the ridge, generally high up, houses were dotted, in every one of which scarcely an individual who remained had escaped the fever, which was most severe above the large mass of decaying matter near the old mouth, which affected every house to leeward of the lagoons, but extended no further, and did not affect residents on the further (landward) side of the ridge. Adults and children, Kafirs and Coolies, alike

"suffered. The Coolies in one camp near the lagoons, separated only by a belt of bush, suffered severely. There were two local predisposing causes in operation, such as swampy ground and brackish water, which causes, however, had previously been quiescent. The type was much more aguish than in the cases on the higher level, and there was no lemon tinge. I believe they might all be classed as ague of a severe type and as ordinary remittent.

"On the ridge near the mouth, before we had ascertained the cause, an unpleasant odour was perceptible in the air.

"The symptoms were those of bilious remittent fever in the severe, ordinary remittent in the less severe cases. The former, especially in persons depressed by anxiety or by alcoholism, became lemon-coloured, and died within six days. In adjoining beds were the Port Louis sailors, who exhibited exactly the same symptoms as these severe cases from the Unguini.

"Here the question of contagion arose, but in presence of a local sufficient cause (which was removed by burning the vegetable debris as far as possible, and causing the rest to be overflowed by re-opening the former embouchure, rendered the houses again habitable by the survivors), no necessity existed to go into a question which might easily have been disproved; for no special, if any, communication existed between the sick crew and this locality, nor were any persons in direct relation with them attacked.

"Some months later, fever of a different type appeared, also suddenly, in a small village at an extremity of D'Urban Bay. Here the land falls easily to the boggy shore of a large shallow bay, into which two sluggish rivers empty, and which communicates with the sea by a narrow channel. At low tide the water retreats from 500 to 600 feet, leaving alluvium partly sheltered by mangroves. For some time the nightsoil of the neighbouring town of D'Urban, collected from boxes, had been carted and deposited here, not very far above the level ground on the slope. Below this, very recently, salt-pans had been banked up, which cut off the ordinary channels of drainage and of rainfall from the land above, and made the soil more swampy. Complaints were made of this road being frequently overflowed. In the surrounding houses, which had long existed and been healthy, fever now appeared, and an inquiry was again instituted. The municipality, anxious for their cess-pools, threw the blame on the mangroves, and actually exposed a large surface of mud by cutting down some acres of them.

"The type was enteric, with delirium and considerable abdominal irritation, showing marked intermissions, as do most acute cases in this neighbourhood, especially fevers; but there was no lemon colour or bilious complication, as in the aguish Unguini cases. The duration was much longer, and the result less fatal.

"There seems no doubt that here the fever was due almost entirely to animal poison; that the sewage matter deposited on soil whose natural outfall was interrupted by salt embankments, sufficiently accounted for the outbreak which some supposed arose from effluvium of these novel unpopular salt-works, or from tidal alluvium, or from mangroves, which had existed before the houses were built, and which lined the shore along the township in the immediate vicinity of streets hitherto without suspicion."

Enteric Fever.

Enteric Fever carried by Milk.—In the Report for 1869 (vol. xi. p. 223) I recorded the remarkable discovery, by Ballard, of the spread of enteric fever by the agency of milk. Four more cases have occurred this year: two at Leeds one at Moseley, near Birmingham, and one at Glasgow. The first outbreak, at Armlay, near Leeds, has been investigated by Ballard*, who has thus been able to give a remarkable proof of the truth of his discovery of the cause of the Islington outbreak. The epidemic commenced suddenly at the end of June, and almost as suddenly abated; there were 107 cases occurring in 68 houses, and 11 deaths; the district in which the outbreak occurred was localized and contained 449 houses; of these, 132 houses were supplied by a dairyman who, on May 18th, 1872, was attacked by typhoid fever; Mr. Coleman, who attended this case and others succeeding it, was struck by the fact that all the persons who at first had the fever, dealt with this dairyman. Altogether 378

* Report to the Local Government Board, August 1872.

per cent. of this man's customers were attacked, while among all the customers of 18 other milk-dealers only 5·3 per cent. were attacked; and these last attacks occurred latest, and probably arose from the usual channels of extension of the disease by the typhoid effluvia from foul privies, &c. The manner in which the disease picked out the customers of the dairyman was remarkable. The channel of the poison getting into the milk was from a pump, the water of which was found to be largely contaminated with sewage, and which was doubtless used to mix with the milk. The evidence is too long to give here in more detail, but it is stated by Dr. Ballard very carefully, and must, I think, convince every one.

The second outbreak in Leeds is minutely recorded by Dr. Robinson.* A number of cases of typhoid occurred in a good class of houses, and on investigation, although some of the houses had bad drainage, others were free from such defects, nor could the cases be traced to fouled water or to direct infection. It being then certain that some other mode of spread was at work, suspicion was directed to the milk supply, and a remarkable coincidence was found to exist between the cases and one particular milk supply. On inquiry it appeared that the milk-vendor obtained an important part of his supply from a farm-house where six cases of typhoid had occurred, and some of the patients were still at the time of the inquiry under treatment. Fourteen out of 18 deaths registered from the locality where the outbreak occurred were in persons supplied from this farm milk. Altogether in the district 93 cases of enteric fever occurred, and 80 of these persons took the milk.

"In Grove Place only one house was attacked, and this was the only one supplied by this particular dairyman. In Great George Street, Clarendon Road, Hillary Street, and Vernon Road, the fever houses were those obtaining this same supply. In one particular instance the milkman went out of his way to supply one gentleman's house, and one only, in East Parade; here five cases of fever occurred, but none in any of the other houses in the street." (p. 14.)

In this case the water used at the farm-house could not have been contaminated, and on analysis contained no sewage impregnations; but the milk-cans were brought into the kitchen, which, as well as the dairy, communicated with the room in which the sick persons lay, and the doors were generally open. Dr. Robinson, on one occasion, saw unclean linen placed on the same table, and side by side with the lids of the cans. The same person attended to the sick and to the dairy. Close to the stable where the cows were milked was a large manure-heap, and in this drained not only the sink-slops, but the common privy, where all the discharges were thrown. The privy itself, which was overflowing, was only 30 feet from the dairy, and 50 feet from the cow-house. The innumerable particles of poison derived from the rooms where the sick were, from their soiled clothes, from the reeking manure-heap and the privy, must have been absorbed by the milk exposed for hours in the dairy, or filtered in the rooms. This case, in fact, is a good counterpart of Ballard's famous Islington outbreak, and shows us the wonderfully dirty and disgusting arrangements which are so common in our dairies, and which must always contaminate milk, although it is only occasionally that an incident like that noted by Dr. Robinson calls attention to them.

The outbreak at Moseley, near Birmingham, at the end of 1872, was minutely traced by Ballard. The enteric fever was found to be unconnected with the many obvious sanitary errors of bad drainage, polluted drinking water, which were common. Many persons in the best houses were affected; far worse circumstanced houses escaped. The whole class of the population, which, when ill, seeks parish relief, escaped. Altogether, from November 30, 1872, to January 11, 1873, 49 families and 93 cases occurred, and there was 1 other family and 3 cases of unknown date. It was remarkable that out of 91 cases there were only 6 males over 15 years of age; all the rest were women and children. Of the 50 families, 47 procured their milk supply from 2 dealers living close together at Balsall Heath; the other 3 families were isolated cases. There were numerous other milk-dealers supplying Moseley, but none of their customers suffered, except the 3 isolated cases above noted.

* "Report on the Sanitary Condition of Leeds for 1872." By M. K. Robinson, M.D. Leeds, 1873. P. 10.

Suspicion being thus thrown on the milk, Dr. Ballard proceeds to show how the further inquiry proved the milk to have become infected. The two milk-salesmen got their milk from separate farms, and there is no doubt that the milk reached them uncontaminated; they both watered the milk from wells which were found to be in communication with dead wells and privies; but as there were other milkmen in Moseley who also watered their milk with water equally foul, and yet whose customers had no typhoid, the foul water *per se* could not have caused the outbreak. How then was it that the water of these two wells gave typhoid fever? Dr. Ballard discovered that there was a privy equidistant from the two wells, to which there was free access from the street, and therefore might have been contaminated. But there was a far more probable source of contamination. A man, aged 70, living at the house to which the privy belonged, died after an illness which was attended by profuse diarrhoea and tenderness of the abdomen. The case was regarded as dysenteric, but Dr. Ballard considers that the balance of probability is that it was typhoid fever, which it is well known may occur in persons of that age, though far more common in the young.

In this way Dr. Ballard believes the impregnation of the milk with the enteric fever poison may be explained. Whether this is admitted or not, the evidence sufficiently shows that the milk was the carrier of the disease, whatever may have been the mode in which the virus got into it.

The case in Glasgow is recorded by Dr. Russell (*Medical Times and Gazette*, March 15, 1873), and seems also a most undoubted case, and Dr. Russell believes that we shall find milk to be by no means an uncommon channel of conveyance.

Enteric fever carried by water.—The carriage of the agent producing enteric fever by water has received some additional illustration. Dr. Stallard* records a case in which the sewer gas from a dry closet pipe was absorbed by a cistern near it, and two cases of typhoid fever occurred in children who drank large quantities of this water, while four other children who had only milk, escaped. The force of the evidence (and it is great) is dependent on the coincidence as to time of the sewer pipe being dry, and the water in the cistern little used, so that there was time for full absorption of gas.

A case is also recorded by Dr. Downes† in which cases of typhoid fever originated in the fouling of well water from an obstructed sewage drain, and in this case no typhoid evacuations appear to have passed in.

An outbreak of typhoid in the village of Nunney, in Somersetshire, was investigated by Dr. Ballard,‡ and the following series of facts was made out. Isolated cases of typhoid fever have occasionally but rarely occurred at Nunney, the last being about four months before the outbreak; the water used by the inhabitants has been liable to be fouled by excrement, and in fact was invariably so fouled, but it did not produce any outbreak of fever. In June, 1872, a man came from a distance with well marked typhoid fever; in a fortnight from his arrival his brother, living in the same cottage, took the disease, and a few days afterwards three children in an adjoining cottage were attacked. About a month afterwards 11 persons in houses at a little distance were affected, and subsequently many others, so that from the introduction of the disease on June 15th. 1872, to the date of the last case on October 26th, there were 76 cases (38 male and 38 female), out of a population of about 832 persons; and 47 of these cases were under the age of 14 years. Dr. Ballard's minute enquiry shows that the drinking water distributed the poison; the first case and those that immediately followed it occurred in cottages situated at the top of the village, and close to a stream supplying drinking water to many cottages lower down; the evacuations of these cases were thrown upon ashpits, and in an open privy full and exposed, and with a channel worn by rain leading from it down a steep declivity to the stream. There was heavy rain at the time when both ashpit and privy must have been surcharged with typhoid evacuations, and these must necessarily have been washed into the stream. This rain was just before the time that the larger outbreak occurred, about a month after the fever had been brought to the village, and when five persons had been affected.

* "Lancet," February, 1872.

† "Lancet," April, 1872.

‡ "Report to the Local Government Board." September, 1872.

The entrance of the evacuations into the stream being certain, the next point of evidence is that it was also certain 73 of the persons attacked drank the brook water, and the other three almost certainly did so; then with two exceptions, one of which is doubtful, no fever occurred in any families using water from other sources. Again, while thus spreading in the houses *down* the stream, there was no typhoid fever in the villages a little *higher up* the stream with one exception, which aids in proving the case. In this exceptional case four children from a village up stream were attacked; they all went to Nunney to school, and drank the brook water, and although two of the children were attacked in the holidays, sometime after the school was closed it was known that they still constantly went into Nunney. There were also two cases of persons coming from a distance to Nunney and taking tea there, who got typhoid fever, Dr. Ballard believes, from the water of the tea which was taken from the polluted stream.

The evidence therefore seems very strong that the water fouled with enteric fever discharges, or washing of clothes from enteric fever patients, gave rise to this outbreak, and that the introduction of these special evacuations was necessary, since the excrement tainted water of previous years had not been sufficient to cause any similar outbreak.

Dr. Ballard has lately examined another case of water-carriage of typhoid in a row of five cottages in a lane (Beoley Lane, near Moseley), separated from all other dwellings except one adjoining isolated cottage. On January 4th, 1873, a boy aged 17 years was seized with shivering, which proved to be the commencement of typhoid fever. Within a short time five other cases occurred in four out of the five cottages; the fifth cottage was occupied by three men, who escaped. In the isolated cottage where there were several children, there was no case. What then was the cause of this localized outbreak? One of the five cottages was inhabited by a laundress who washed for a family in Moseley, where there was a case of enteric fever, the foul linen (which was not disinfected during the earlier days of the outbreak) and the water in which these clothes were washed, was thrown into a channel made of loose puddled bricks, which ran over the top of the well, being only $1\frac{1}{2}$ inches above the imperfect wooden cover of the well; the space between the channel and cover was filled with clay and ashes, through which water might easily percolate. The case in Moseley died on January 11th, having been ill from December 11th. As already noted, the first case at Beoley Lane occurred on January 4th. His evacuations were thrown on to a midden only a few feet from the wall, and probably there was percolation here also.

Cholera.

Latest Discussion in Germany on Cholera.

The causes of the spread of cholera are of such interest to every one that it seems desirable to briefly notice the latest discussions in Germany on this subject. The great reputation of Pettenkofer, his acuteness and able statement of his views, have insured his opinions a wide acceptance, and are at the present moment influencing the course of investigation both in Europe and in India. If, as some suppose, Pettenkofer has been on a wrong track, his influence may unfavourably bias the investigation, and it seems important to exactly define his position and the value of his arguments. He has, in the course of years, changed several of his views, and has been subjected to some sharp criticism in consequence, and lately a very able and thoughtful attack has been made on his ground-water hypothesis, by Dr. F. Sander,* and to some extent, by Küchenmeister.† Pettenkofer has found it necessary to reply to Sander in a long article in his Journal,‡ entitled "On the present state of the cholera question." In this he has defined his own views, and has discussed with

* "Untersuchungen über die Cholera in ihren Beziehungen zu Boden und Grundwasser." Von Dr. Fr. Sander. Cologne, 1872.

† "Handbuch der Lehre von der Verbreitung der Cholera." Von Dr. F. Küchenmeister. Erlangen, 1872.

‡ "Zeitschrift für Biologie." Band viii., p. 492. 1872.

great ability the general question of the spread of cholera. A brief notice of these three essays will enable us to analyse and probe what Pettenkofer's opinions are at this moment. Sander's conclusions are these: he does not deny that in the spread of cholera there is, to use the language of Pettenkofer, "a disposition given by time and place," or, as we should say, by conditions of season and locality. In fact this is one of the most obvious points in the spread of cholera; in India the cholera seasons of special places are well known; and the prevalence of cholera in certain spots, and the exemption of others have long been observed with the greatest interest. Sander does not again deny that the condition of the soil may play a part in some instances in favouring or preventing the spread, but he considers such a part as non-essential so to speak, and that the local favouring conditions, whatever they may be, need not be connected with the soil. Beginning his enquiry with a leaning to Pettenkofer's views on this point, he has gradually found it necessary to diverge from him, and has been obliged to attribute a great importance to infection, by means of the intestinal excreta, and to multiplication of the "cholera-ferment" in the bodies of men. Küchenmeister has come also to pretty much the same conclusion. He considers cholera without men to be inconceivable (*Eine Cholera ohne Menschen ist undenkbar*, p. 448); epidemics are produced sometimes by direct infection, more frequently by the aid of so-called "helping causes" in the ground. As means of this spread we have, he says, in India as in Europe, traffic and intercourse with cholera-sick men and places, and before everything proximity to their clothes, foul linen, house utensils and privies. The most probable carriers of the infecting matter are considered by Küchenmeister to be the cholera dejections, and the failure of the so-named disinfection of the dejections in the ground, or in privies, is no proof against this view. That the cholera moves with the wind, as in Bryden's hypothesis of the monsoon cholera, Küchenmeister consider not only improved but as improbable, as he believes Bryden's charts are drawn on a false plan, and that the experience also in Madras, and Bombay, and Calcutta, is opposed to this view. How far the monsoon influences the spread by modifying traffic and communication, is a matter for further inquiry. Starting then from this point, Küchenmeister considers the "helping-causes of place and season" to be air-temperature and rain; especially the permeability of the soil for the air-temperature and air masses in the superficial and deep strata; and after these he considers that the putrefactive changes in the soil are of importance. As to temperature of soil he considers that it is tolerably certain that cholera will not spread if the temperature of the upper strata of the ground which are in relation to men, sinks under 54.5° Fah. (10° R). The ground water plays a part, he thinks, in the cholera-spreading, but not that which Pettenkofer ascribes to it, and other conditions, especially the temperature of the soil, and the amount of moisture in the upper layers, are of much greater importance than the ground-water. In addition to peculiarities of place and season he assumes an individual disposition dependent on race and "cholera acclimatisation," but both, he says, are only relative and not absolute. With regard to the spread through drinking water, this has been as often affirmed as denied in Europe as in India. "The worth of this opinion," says Küchenmeister, "is daily lessened among us."

Such then are the opinions of these two writers, which differ only from those received commonly in India and England in the doubt expressed on the spread of drinking water; a doubt also shared by Pettenkofer.

As already said, Pettenkofer replies especially to Sander in a long article. He refers to his own changes of opinion, and believes such changes to be inevitable with every one. He rates our knowledge of cholera low, but wishes to define his present views as carefully as he can.

He begins with a reference to the old terms of miasma and contagion, which he uses in the sense that "Contagium" is a specific infection-matter arising within the body of the person, and miasma an infectious matter, arising outside the body. He also does not deny that possibly some of these matters may spread in both ways, and if so the old term "contagious—miasmatic diseases," would be rightly applied to them, but as he finally remarks, it must be proved that diseases do actually spread in both ways, and he evidently holds it to be unlikely. Pettenkofer has thus stated again the old controversial phrase of

the contagious and infectious conflicts of former days. He points out that if there be a "contagious-miasmatic disease" (in the true sense of the word), it must be always possessed of the same properties, and must spread in both ways. We cannot suppose, he considers, that it may now spread entirely miasmatically, and at another time entirely contagiously.

He then observes that cholera, typhoid, and yellow fever have many similarities in their spread. They are, he considers, importable, but not contagious diseases, but he refers for this opinion to some very weak evidence respecting yellow fever.* In his discussion on this point he notices Macpherson's tables of the great variations from year to year of the outbreaks of small-pox in Bengal, and concludes that from our present views of contagion, and personal predisposition, we cannot explain these variations, and that without the least denying contagion and predisposition in small-pox, he thinks we cannot at present say that the virus may not increase out of the body altogether, and that even small-pox may therefore be a "contagious-miasmatic disease." But as far as typhoid, cholera, and yellow fever are concerned, he believes that they are miasmatic diseases, *i.e.*, that the agency propagates itself only outside the body. Transportability of cholera by men and human intercourse, which is, he says, undoubted, is not to be taken as equivalent with contagious. There are places free from cholera, and which remain free; however frequently Lyons has been invaded by choleraic persons no epidemic has ever occurred there. He argues this point, and the spread on board ship, at some length, and finally states that in the course of the observations which he has made, his opinions have been altered in many ways; at first he stood like so many others, with a predilection for the contagionist side, but was gradually, by the continued pressure of facts, driven from that position, and now believes that the customary contagious doctrine has been the greatest hindrance in our search after the nature of cholera, since our glances have not fallen on the right point, but in directions where what we seek is not to be found. He concludes (p. 508) "that cholera is carried by traffic, but is not on that account a contagious disease; that the causes of the increase of the cholera-infection matter are to be sought in the surroundings of men, and not in the men themselves."

Of these surroundings he attaches, he says, an essential part to the soil; how else can be explained the prevalence in one place, the exemption in another, and he cites, as a perfect illustration and argument, the following case:—"In the Crimean war, at the siege of Sebastopol, there was in the English camp a row of huts, which were successively occupied by detachments of the 79th Highlanders, the 31st Regiment, and Artillery, and invariably showed a disproportionate greater number of cholera cases. In the Report on this point it is said—'As it was thus found that the cholera showed no tendency to leave these huts, they were taken down, and put up in a higher site, they were then, in this new site, occupied by the troops; there was one cholera case, and then the disease ceased entirely'" (p. 509). This proves, he thinks, absolutely the essential participation of the ground, and he believes this participation can be conceived to occur precisely in the same way as in agriculture. The ground is a necessary concomitant in the growth of our cereals. The newer agricultural chemistry may teach us that maize and other cereals may be grown without a trace of soil, may take root, for example, grow and ripen in water, provided the water contains all the nutritive elements which the soil gives, and the acid reaction given by the roots to the water is daily neutralized, but still no one would say that the water can take the place of soil in agriculture.

If I rightly understand this argument it is that Pettenkofer would not deny that the cholera "miasm" could grow in water, as a grain of maize may if all the nutritive materials were supplied to it, but that it would never find these naturally in water, but only in the soil. He goes on emphatically to repeat the

* I have been much struck by the fact in how small a degree our ideas have become more precise during the last 25 years. I attempted to state the contagious and the non-contagious or miasmatic theories in a Report on the early cases of Cholera in London, published in the July number of "The British and Foreign Medico-Chirurgical Review" for 1849, and in some reviews on yellow fever in the same journal in 1848 and 1849. The argument travels over almost precisely the same ground as in the paper I am noticing above.

opinion he stated at the Cholera Conference at Weimar in 1867: "We know that cholera is spread by traffic; we know that other additional circumstances are necessary, in order that an epidemic shall arise, and many men fall sick in one place. If only in a single case the participation of the ground is a matter which is indifferent, the same must be allowed in all other cases. I consider at present that those cases which appear as if the ground were unnecessary, are not properly analysed. If we give up the influence of the ground in a single case, then such influence is no longer necessary for all other cases."

With regard to the "drink-water hypothesis," Pettenkofer says he has proved that in many and heavy epidemics, the participation of the drinking-water was impossible. As he was driven to seek for other local influences in these cases, so he lost the right (according to his view) to lay more weight on the water hypothesis in those cases in which it was not disproved than in those in which the influence of the drink-water was shown to be nil. He thus found himself always thrown back on the ground as the seat of the local condition which determined the epidemic.

In expressing himself thus, Pettenkofer appears to disregard the strong positive evidence which has been accumulated, to show that the drink-water may carry the agent. He can undertake to say, and no doubt rightly, that in some cases the drinking water was not in fault, but he stretches his inference too far, and nothing justifies him in the opinion which he seems to hold so strongly, viz., that there can be only one mode of spread. In his work on the spread of cholera in India, he seems quite unaware of the strong positive evidence of the transmission by drinking water, and he refers to the instance given by Sir Patrick Grant, although this has been completely disproved by Cornish* and Barclay.

Pettenkofer then passes on to the consideration of cholera on board ship, which Sander considers as fatal to the ground and ground-water theory. Pettenkofer does not allow this, and enters on a long discussion. His argument appears to be this: in no case is the spread of cholera so infrequent as on shipboard, although the conditions there are more favourable to the spread of a contagious disease than in other cases. The specific cause (*die spezifische Ursache*) of cholera is from time to time spread by means of human traffic from India, or from other endemic sites. In this spread there is (besides individual disposition) "a place and time disposition." There are places where cholera, often introduced, never spreads; there are times when in a place which it is known can have epidemics, it does not prevail. Now, in ships the cholera is introduced from land, but in by far the greater number of cases of ships at sea, the ship is like one of those places on land which want the local disposition, and which cannot therefore be attacked. The attacks of cholera on shipboard die out, and generally restrict themselves to persons who in all probability have been infected on shore. In cases in which considerable outbreaks have occurred on shipboard, the cases are usually confined to those who have been in connection with some particular place on shore; it attacks the passengers and not the crew, or one company of soldiers and not another, &c.

And yet he admits there are some cases of real epidemic outbreaks of cholera on board ship. If we are to be consistent, and not to give up the etiological rule of the identity of the causes of cholera on land and at sea, we ought to ask, it is said, how the conditions of time and place which are necessary on shore happen in these particular cases to exist on board ship? No doubt the hypothesis of contagion would most easily explain these instances, but then by far the greater number of attacks on shipboard are not consistent, and all rational grounds are wanting to connect such epidemic outbreaks, with contagion. If cholera on board one ship has a contagious character, what prevents cholera from being contagious in all ships in which the infectious matter is introduced?

If I understand Pettenkofer aright, this argument runs thus: we cannot explain such instances of epidemic on board ship by contagion unless we admit that contagion plays an equal part on board other ships and on land, which it undoubtedly does not do. There is something special on board these ships

* "Lancet," May 11, 1872.

with epidemic outbreaks, which makes the part they play identical with that the ground plays in epidemic outbreaks on shore. What that is, is quite unknown. We must renounce, with our present small knowledge of cholera, any presumption of being able to explain such occurrences now, but ships offer one of the best means of investigating certain points in the history of cholera. If we only knew why the cholera infection material is so seldom operative on shipboard, we should be able to apply this fact at once to the case of places on land which enjoy immunity.

Passing on from this point, Pettenkofer refers to another criticism made upon his theory, viz., that he holds the opinion that the "cholera germ" (cholera keim) can increase only in the ground; he has expressly stated the contrary. If x be taken to mean the "cholera germ," which is brought by human intercourse, and y the favouring local condition which allows it to grow, all he has contended for is, that this condition y is somehow or other furnished by the ground; but x and y may meet either in or out of the ground, either in the body or out of it.

A third reproach which is made—viz., that he has not given accurate and constant signs of a cholera ground, and has not precisely stated the necessary degree of the ground water, i.e. when the ground is too dry and when too moist to allow an epidemic of cholera to occur—Pettenkofer admits to be true; he can only say, with Pio Nono, "Non possumus." We cannot precisely state these facts; we all have much to learn and much to forget; but it would be a great error, he thinks, not to discuss things because they cannot be rigidly defined.

Pettenkofer passes on from these general considerations to discuss, with his accustomed acuteness, some of the remarkable cases of exemption from attacks of cholera when neighbouring places or parts of the same city have been severely attacked; the people, food, homes, and other considerations being identical. He shows how, by excluding other causes, we are led back to the ground as the cause of the prevalence in one case, of the exemption in another. He then goes on to discuss the Indian Reports, which appear to have a great attraction for him, and some of the instances in Europe which Sander has adduced against his ground-water theory, and concludes his long and interesting article with a few remarks on the mode of investigation of the part which the ground plays, and of the measures which should be adopted to check an outbreak of cholera. In speaking on this last point, he states that "house to housevisitation," which has always been thought to be an English contrivance in the epidemic of 1848-49, is really a German plan, and was used in 1836-37 in Munich with the best results; but I am under the impression it was commenced in England in 1832.

If now I attempt to analyse Pettenkofer's views, I do so more with the view of attempting to define the course which inquiry should take, than with the intention of offering any decided opinion on the question of the necessary participation of the ground.

1. The point which Pettenkofer holds most decidedly, as well as Sander and Küchenmeister, is that there is a specific cholera-producing substance which is spread only by human intercourse. Although he refers to Bryden's monsoon theory, and even uses the term himself, I gather that he does not mean that the cholera poison is carried by the wind, but merely that the monsoon gives favouring conditions, such as rain.

2. He then thinks that this cholera virus or miasm cannot by itself produce cholera in any case, but must meet with some unknown local condition or conditions in the ground or out of it, but if out of it, still furnished by the ground. If x express the unknown cholera miasm, and y the unknown local conditions, then x must meet y to produce the agent which in a susceptible person can cause cholera. The reason which appears to have led Pettenkofer to adopt this opinion is the fact that cholera sometimes spreads and sometimes does not spread. There are some places with plenty of susceptible people, in apparently very bad sanitary condition, among whom the "cholera germ" is introduced, and yet who remain untouched; in other cases a widespread epidemic follows. The old explanation of an epidemic constitution is untenable, as the places may be close together, the time and season may be the same, and all conditions apparently equal; yet they are not equal, for in one place, A, the

disease spreads, and in the other, B, it does not. To use Pettenkofer's language, the unknown condition *y* exists in A, but not in B. Impressed by this undoubted fact, Pettenkofer has adopted the conclusion that *y* is always *necessary*—that it is not simply a favouring condition which aids the spread of a poison, but that it is essential to the formation of that poison.

After as careful a consideration of Pettenkofer's views as I have been able to give them, this appears to me to be the weak point in his argument. He has not shown that it is necessary for the explanation of the facts that we should suppose *x* alone to be incapable of producing cholera. He has not shown that no other explanation is possible than the one he brings forward, viz., that an unknown condition, *y*, must act on a freshly introduced unknown agent, *x*, to produce a third body which causes cholera. But, above all, we see to what extent this view leads him. He is pnt to the greatest straits to make his explanation of the reason why the place A suffers and the place B is exempt accord with other undoubted facts of cholera. He rejects *in toto* the water carriage of cholera, though to so many of us the evidence seems so strong; for the view that the cholera germ *x*, passing into water, could there meet with *y*, could not be maintained; but if it does not meet with *y*, and yet the water gives cholera, then *y* is unnecessary, and *x* by itself is sufficient to cause cholera; and if sufficient in water, it may be so in other ways—may be introduced by food, for example, or through the air. Pettenkofer sees that his whole theory is cut from under his feet if he concedes water-carriage of the cholera, and he refuses to do so. He is led again, by the same reasoning, to deny the immediate contagion of cholera.

Sander has brought forward the remarkable cases of immediate contagion (which are not without parallel) of the outbreak of cholera at Chezetcook and Halifax, Nova Scotia, narrated by Deputy Inspector-General M^cVittie Lloyd.*

The ship "Franklin" left Stettin on the 10th October, 1871, and Christiansand on the 15th, with 600 German emigrants on board, both places being said to be healthy. Eight days after leaving Christiansand (23rd October), the first death occurred, and before arrival at Halifax on November 6th, 40 deaths altogether had taken place, and no doubt from cholera. Two men who went on board from Halifax to assist in watering and coaling, on returning to land were both seized with cholera. One of them (Melvin) died in 12 hours; the other (Lepière) recovered after a severe attack. This man (Lepière), when severely attacked, was sent on the 13th November to his family at Chezetcook, a small fishing village 22 miles from Halifax, and there (on the 17th, 18th, and 19th of November) four members of his family who nursed him, but who had not been at Halifax, got cholera; two died, and the others were severe cases, one having suppression of urine for four days. No cholera had been seen in Nova Scotia since the spring of 1866, when the steamship "England" had arrived with some cholera on board.

If a case of this kind were an isolated one it would still not do to neglect it, but supported as it is by other similar instances of rapid spreading of cholera from person to person, no theory of cholera which does not include it can be held to be good.† Now, how is this most easily explained? Is it most reason-

* "Lancet," February, 1872.

† The introduction of cholera into Guadaloupe in 1865 has been lately carefully discussed by Pellarin ("Contagion du Choléra démontrée par l'Epidémie de la Guadaloupe. Par A. Pellarin. Paris, 1872). It was a clear case of importation. It may be briefly summed up thus: on the 20th October, 1865 the "Sainte Marie" arrived from France (Bordeaux) where cholera prevailed, and having lost a man after a long illness, whose disease looked like typhoid fever, as far as could be gathered from the Captain's account, but there was something more, which was concealed. A young man went twice on board the vessel and returned with a parcel of linen for a washerwoman; on the evening of the 22nd this young man was seized with cholera and died next morning. On the 25th October the washerwoman who, it is believed, had received the clothes was seized with cholera and died in the evening. The evidence that she had actually received and washed the clothes from on board is not certain, but is very probable. The third case was a child of 12 years old, who had been with the first case during his illness. Then four washerwomen who had washed at the same place as the first washerwoman died in succession. Then it spread through the vicinity and gradually over the whole island.

able to adopt the ground theory of Pettenkofer, which supposes that the "cholera germ," taken by Lepière to his home, got into the ground, or met with another condition which the ground furnished, and that from this meeting the agent issued which killed two persons in a few hours, or the view that some agent was at once transferred from Lepière to his relations which gave them cholera? Now Pettenkofer, who is a man of perfect fairness, does not deny the facts; he admits that they have to be explained, but he seems to avoid realizing what the force of the evidence really is; he seems to think an explanation will be found which will show they are not really in antagonism with his view, but he has actually no ground for thinking so.

So also other cases—rare, it is true, in which cholera has spread from person to person—are very strongly to the idea of the necessary participation of the ground.

It is not denied by the opponents of Pettenkofer that in a vast number of cases something else is operative than the mere introduction of the "cholera germ"; that some favouring conditions are in action without which, in most places, cholera will not widely spread; and that there may sometimes be influences from the ground; but in the face of such facts as those stated above, they refuse to admit that Pettenkofer is justified in his absolute assertion of the necessity of ground influence.

3. Having thus, in his own mind, become persuaded that the "cholera germ" will not alone produce cholera, but must have local conditions in order to develop into the actual poison, Pettenkofer's third stage of argument is to show that these local conditions are connected with the ground. He is led to the ground by two roads: first, by exclusion, as he can find no other constant condition; second, by examination of the ground, which shows he believes that all places favourable to the spread of cholera show certain characteristics of aggregation, moisture, and rise and fall of the ground, or subsoil water. With regard to the first of these arguments, it is open to anybody to hold that Pettenkofer has too much neglected the introduction of cholera by water, food, and perhaps air; and, as respects the second argument, it cannot be doubted that at present the evidence Pettenkofer, with such immense industry has been able to array falls far short of demonstration; and that the decision whether the condition of the ground is really a matter of moment in the spread of cholera, and, if so, what is the exact condition which is thus favourable, are points which have still to be decided by the evidence alone admissible in scientific inquiries—viz., a sufficient number of well-authenticated facts.

To me it certainly appears, at the present moment, that Pettenkofer's ground and ground-water theory is less probable than it appeared to be some years back. That the ground has an influence is highly probable, and is in fact a very old opinion; but when it is seen how very indefinite even Pettenkofer's own evidence is, and how uncertain are some of the cases he relies upon, I think it must be admitted that the enigmatical spread of cholera has not been cleared up by him. Küchenmeister's views, on the other hand, seem more accordant with facts.

If without presumption I may venture to criticise Pettenkofer's mode of looking at this subject, I should say he has allowed himself to be too much impressed by the instances in which cholera does not spread after introduction. In attempting to explain, instead of simply admitting that we cannot yet explain such cases, he has passed beyond the boundary of ascertained facts, and in so doing appears to me to have lost his hold on what are really truths. The view which looks on the cholera poison as being carried by men, and then increasing and spreading more or less in various ways, by water, air, or food, according as it meets with favouring conditions, is more in accordance with facts than the view which assumes that two unknown quantities must be brought together in order to evolve a third.

One point may be noticed in this discussion, the unhesitating belief of all parties (Küchenmeister, Sander, and Pettenkofer) that cholera is spread only by human intercourse. With them this point has passed out of the circle of controversy: they consider it settled. The views of Bryden, interesting as they are to them, have apparently made no impression; and the wind-driven theory of cholera spread has found no acceptance at their hands.

The Carriage of Cholera by the Wind.—The opinions lately advanced by

Bryden, and which are a revival of the old doctrine that the cholera poison is carried by the wind, have been critically tested by Cornish,* by an examination of the successive steps by which cholera entered and traversed the Madras Presidency in 1869-70. Maps are given to show this extension, and it is clear that, to use Cornish's phrase, the extension was "marginal"; it never occurred *per saltum*, and its course was in opposition to (*i.e.* was not influenced by) the prevailing wind. For example, when the cholera invaded the district of Kurnool in January 1869, it spread gradually throughout, and in certain directions, *viz.*, from north and west. Now, during the whole of this time the wind was from the east, south-east, or south; and during the first 15 days in January blew at an average rate of 121 miles in 24 hours.

In April, May, and June, cholera was moving from the north and west towards Madras; the winds were blowing on the coast with great velocity from south-east or south, and in June to the south-west. The average daily velocity was 260 miles in 24 hours in April, May, and June; and yet cholera invaded the Madras district from the opposite direction. If we have any regard for facts, we must admit that in these two cases the progress of cholera not only owned some other cause than the wind, but that the wind in no way checked it.

After passing to the south, cholera reappeared in districts it had gone through and left. There was a so-called "backward movement," and here again the direction was in several cases in the teeth of the wind.

Introduction of Cholera by Food.—The belief now generally held that in a certain number of cases the cholera agent passes into drinking water, and is thus introduced into the body, has given rise to the opinion that a similar introduction by food is possible, and that some of those sudden local and circumscribed outbreaks, which are certainly usually attributable to water, might occasionally be explained by food. Some instances in favour of such a view have been published by Dr. Cleghorn in India, and lately a local outbreak at Delhi has been recorded by Dr. Fairweather.† The facts are these:—In 1871 there was very little cholera in the Punjab, or anywhere in India. In October and November, however, Lucknow suffered; and on the 28th November there was a sudden outburst at Delhi. On the 20th November a man named Doolla died of cholera, as was subsequently ascertained. There had been two or three other cases in the neighbourhood. The discharges had flowed on the earthen floor of the room in which he died; this floor had been cleaned, it was said, and washed with cow-dung and water. On the 26th of November a burial-feast was given in this room by his brother. The food—rice, ghee (clarified butter), sugar, and spices, all of good quality—was cooked in this room on the previous day and night, and the moist and hot rice was spread on an open mat laid on the earthen floor. The dead man belonged to the "Reghar" caste, who are tanners, and almost all the males of the caste (about 350, but the exact number is not known) attended the feast. Some of the guests carried home portions of the feast to their wives and daughters, who did not attend. Besides the Reghars, only a few outsiders attended. The feast took place at midday on the 26th November, and a few hours afterwards there was an outbreak of cholera among those who had attended. The period of the first cases was not certain, but up to 6 p.m. on the 29th November, 47 cases had occurred, and 15 persons had died; and altogether to the 4th December there were 73 cases and 46 deaths. The attacks and deaths were not confined to the men and boys, but were almost as severe among their wives, though not so bad among the daughters. Taking the whole Reghar caste (male and female), some of whom (female) may possibly not have eaten any of the food, the proportion of attacks to population was 10·8 per cent.

The disease did not spread in Delhi, but died out.

Now this localised outbreak could not be explained:—

1. *By reference to locality*, because mixed up in the district with the causes of the Reghars are those of another caste, the shoemakers or Chamár. No Chamár attended the feast, and no Chamár was attacked. There are men

* "Report of the Sanitary Commission for Madras, 1871." Appendix I.

† "Report of the Sanitary Administration of the Punjab for 1871." Lahore, 1872.

belonging to neither caste living in the district; a few of these were invited to the feast, and these suffered like the Reghars, but those not invited escaped.

2. *Nor can the outbreak be explained by reference to water*, for Dr. Fairweather looked into this point and satisfied himself the water was not to blame.

3. *Nor by reference to effluvia from the earthen floor of the room*, for the women and girls suffered who were not in the room.

4. *Nor by the supposition that it was some air-born miasm heralding in an epidemic outburst*, for the other inhabitants of the locality did not suffer, and there was no subsequent outburst in Delhi.

Can any experiment be more complete to prove that it was the food which caused the outbreak? If so, as the food was proved to have been of good quality before cooking, it must have got some noxious property during the cooking. Now the masses of hot rice were heaped on the earthen floor which had been covered with cholera discharges; the particles of cholera dejections may have undergone some change in the ground or not, but that in some way the cholera poison must have attached itself to the particles of the hot and soft swollen rice must, I think, appear to everybody as the only reasonable explanation. Let anybody look upon it as a matter of evidence without any pre-conceived notions and reflect on the cogency of the evidence in all points, and I think little doubt can remain. If we do not admit this explanation, then it is one of those mysterious outbreaks we cannot account for, but why should we be so fond of making mysteries where none really exist?

Dr. Fairweather was anxious to learn whether those who partook of the rice at the top of the heap, and which was farthest from the floor, suffered least, but he found it impossible to ascertain the order of serving, as the brother who gave the feast had died of cholera, but he ascertained that two sweepers, who would probably have had the rice nearest the floor, had died among the first.

This outbreak seems opposed to the view that any influence was exercised by the ground; that the changes in the ground water had any influence is of course impossible, and it does not seem at all likely that the hard beaten-down clay of the floor of this room should have produced in the cholera poison any change, or should have supplied some other factor, as Pettenkofer would suppose. On the contrary, the facts seem directly opposed to any direct or indirect influence of the ground. But an effect may have been excited on the cholera discharges which had been poured on the floor by the mass of hot steaming rice which was heaped upon it, and it is not only possible, but likely, that this high temperature was one of the agencies in this remarkable outbreak.

Introduction of Cholera by Water.—A localized outbreak of cholera as remarkable as that of Delhi occurred at Secunderabad in 1871, in the Deccan, and has given rise to much debate.* On the morning of the 24th May, 1871, no cholera was known to exist in or near Secunderabad, but subsequent inquiry showed that in the villages on the road to the eastern coast cholera had been prevailing for some weeks, and it was severe in the neighbouring districts of Kistnah and Nellore. Moreover, in the second week of May cholera was exceedingly fatal in the village of Sovriapett, within 80 miles of Hyderabad on the main road. On the 23rd May, also, three travellers reaching Hyderabad along the main eastern road, died of cholera in the most densely populated part of Secunderabad. On the 23rd May, a party of cart drivers arrived at the village of Chilkulgoodum, having been attacked by cholera on the road and lost several of their number. This village "is in close proximity to the barracks, hospital, horse lines, and horse-keepers' tents of the 18th Hussars."†

It was thus afterwards shown, though unsuspected at the time, that cholera had been brought close to the 18th Hussar barracks on the 23rd May. On the morning of the 24th (Queen's birthday) the Hussars paraded in fairly good

* "An Enquiry into the circumstances attending an outbreak of Cholera in H.M. 18th Hussars at Secunderabad in May, 1871." By W. B. Cornish, Sanitary Commissioner for Madras.

† "Report of the Sanitary Commissioners for Madras for 1871." Appendix III.

† "Madras Report." Appendix III., p. 22.

health ; there was only one old case of diarrhoea in the hospital, and none of dysentery. After parade the day was a holiday, but it was not ascertained if any of the Hussars had gone to Chilkulgoodum. There was no alteration of food on that day, no extra issue of liquor from the canteen, and no drunkenness. At 10 P.M. on the night of the 24th, a patient in hospital with fever was attacked with choleraic purging (was it really choleraic, and not typhoid purging ?) ; a few hours subsequently two men were brought in from different barrack-rooms, and then one from the married people's quarters. In 26 hours from the first case 34 men and 1 child were attacked, and in the next 24 hours 18 more cases occurred ; cases occurred for three days more, but in lessened numbers, and on the fifth day the outbreak was over. In all 85 persons were attacked, out of a strength of 385 men, 56 women, and 108 children. All the barrack blocks but one furnished cases.

All the Infantry and Artillery in Secunderabad had not a single case ; the officers of the Hussars also escaped. In the Native Bazaar the disease, which had commenced on the 23rd May, continued till the 23rd July, but was not severe, as there were only 252 cases and 117 deaths in two months, out of a population of between 40,000 and 50,000.

Now in this localized outbreak the disease was brought by travellers close to the Hussars barracks on the 23rd May ; on the 25th the Hussars got cholera, while the troops in the more distant barracks entirely escaped. We cannot for a moment doubt that the travellers brought the disease to the Hussars, but by what channel of entrance did the poison get into the barracks ?

It is quite clear that in such a case as this Pettenkofer's views break down entirely and irretrievably. He asks for a case where the ground could have no influence ; here is a decided case, because it is not only impossible to suppose that the ground under the barracks (which were perfectly clean, and with drains in good order) got contaminated with the supposed factor *x*, but there is a crucial piece of evidence against the ground. The Hussars marched out from the barracks, and a guard of sepoy was put in, and 400 native labourers were employed to clean the infected rooms. A company of native sappers opened the drains and bricklayers were at work. Not a man of these got cholera, or had the slightest indisposition ; but if the ground had been impregnated it is impossible they should have thus escaped.

The ground theory, in any shape, as in the case at Delhi, breaks down hopelessly.

What then was the cause ; was it in the air, the food, or the water ? It appears that the direction of the wind was north-west up to the 25th May ; the village of Chilkulgoodum is south-east of the barracks, so that the wind was blowing on the 24th and 25th *from* the barracks towards that village. It could not have been air-blown, therefore, neither was it in the food, as all the regiments had the same issues.

The question of water supply has given rise to great differences of opinion. Dr. Branfort Scott, who was in charge of the regiment, altogether denies its influence, but Dr. Cornish has adduced reasons all but conclusive to show that the Hussars obtained some of their water from a public well, which was liable to be fouled by impurities. But there is no certainty where all the water was obtained, as it was brought by the native water-carriers from any place they chose, and it so happened that there were two wells, one in the horse lines, another near the horsekeepers' lines, both of which are "within an easy distance" of the Chilkulgoodum village, where the cholera-stricken carters halted on the 23rd May. Whether this was so or not is incapable of proof, but it is curious that a suspicion existed at the time of the outbreak that the water had been brought from an impure source.

At any rate the evidence shows that introduction by water, &c., was far the most likely cause of this most remarkable localized outbreak, and as the introduction by ground effluvia, and air and food poisoning was disproved, the argument from exclusion is of no mean weight.

A singular localized outbreak of cholera was related to me by Assistant-Surgeon C. A. Maunsell, R.A. At Morar, in Gwalior, a severe localized outbreak of cholera occurred in his battery, while the other corps at the station were unaffected. Shortly before a woman had been found dead by the well supplying this battery, and it was afterwards discovered that she had died of cholera. Only the corps using that water suffered at that time.

Dengue.

The late outbreak of dengue in India presents many remarkable features, and some lectures by Dr. Charles, of Calcutta, give a very good account of it.* The disease has before been known in India, in 1780 (on the Coromandel Coast) and in 1824 in Calcutta; in 1853, and, to a small extent, in 1868-69. In 1871 it appeared at Aden, having, it is supposed, been brought there from Zanzibar; it then reached Bombay in two troop-ships which had touched at Aden and spread to various inland stations with these troops. Dr. Charles, however, does not consider that these importations brought the disease to Calcutta, as there had been a case (which he did not see) in that city before the arrival of the troop-ships at Bombay. In fact, he says, the disease is endemic at Calcutta, and not a year passes without his seeing cases. This is a very important assertion, which ought to be carefully verified, as it affects materially opinions as to spread. The occurrence of such presumed sporadic cases has introduced great difficulties into the discussion on cholera, in which disease, both in India and Europe cases resembling, and not identical with true cholera, have prevented the channel of introduction of the agent *ab externo* from being recognized. Dr. Charles may be correct in believing that true cases of dengue occur every year in Calcutta, but it is certainly a point which ought to be settled by the most rigid inquiry and detailed proof.

Commencing, however, in Calcutta, in the autumn of 1871, it spread over the whole of Calcutta in a few months, and was at its height in March 1872. Dr. Charles gives some figures to show the number of attacks. Among 2,324 Europeans and natives employed on the Government Railway, 1,636, or 70 per cent., were attacked. Among 3,356 persons employed on the East Indian Railway, 2,066, or 61 per cent., were attacked. Whole households were attacked at once. Dr. Charles has not the least doubt of its contagion. He refers to "instances of a person from an infected locality proceeding to a station as yet free from the disease, and often getting ill, either just before or after his arrival, serving as a centre from which it was spread widely to those around. I could relate, too, very numerous instances of servants who contracted the malady from their companions in parts of Calcutta where it was prevalent, carrying it to those whom they served in houses previously exempt, and first communicating it to the child whom they had special charge of, the mistress whom they attended, or the master with whom their duties brought them into closer relations. Allied cases, also, might be forthcoming in any numbers, of the head of a household brought in contact, in his office or elsewhere, in the course of business, with those recently affected by the disease, contracting it, and serving as the medium for infecting his household, which previously had escaped other sources of contamination. Contaminated localities, in a similar way infecting those exposed to their influence, afford evidence of a like tendency, as I have again and again seen visitors to a house in which the inmates had lately suffered contract the disease before long. Another class of facts which I believe to deserve attention are those supplied by visitors to a house being the first to take the disease and communicate it to their host." (p. 90.)

Dr. Charles notices, however, that while forcibly struck with the power which dengue has of being communicated, there were very numerous instances in which a single member of a family was attacked and the others escaped, and in other cases a single individual escaped while all round them were seized. There was some receptive power necessary. Quarantine, in many cases, gave immunity.

The contagious property of dengue being admitted, would this account for the widespread outbreak in a susceptible community? Dr. Charles evidently thinks not. As he believes dengue occurs every year, there must be, he thinks, some aiding cause, and he seeks this in the old hypothesis of an "epidemic constitution." But if it could be shown that the so-called sporadic cases of dengue are not really so, the hypothesis of an epidemic constitution would not

* "Clinical Lectures on Dengue." By T. E. Charles, M.D., Professor of Midwifery in the Medical College, Calcutta. Calcutta, 1872.

be necessary. If this epidemic constitution existed, its nature has not been pointed out.

With regard to the incubative period, Dr. Charles places it within seven days after exposure, and usually about five. He has seen cases occur in two or three days, but questions whether there had not been prior exposure.

Possibly, however, the incubative period may be even shorter than two days. The following instance was related to me by a friend who was an officer on board a sailing vessel which arrived at Calcutta:—A few days after arrival he went on shore for the first time, to visit two friends both ill with dengue. He returned to his ship in perfect health, and the very next day was seized suddenly with dengue. The disease then went through the ship, and attacked every person (about 30) on board. Now here it is of course possible that this young gentleman may have caught the disease on board from some one who visited the ship, but it seems more reasonable to refer it to the undoubted exposure of the visit to two persons who actually had the disease at the time, and, if so, the incubative period was about 24 to 30 hours.

Dr. Charles mentions that dengue attacked some persons more than once. In one case there were three attacks, still this is not very common, and one attack is to a certain extent protective.

The Influenza of Horses.—In 1827 an epidemic catarrh attacked horses throughout almost the whole of Europe; by some it was thought to be contagious, by others not; and inoculation experiments (transfusion) did not succeed. Man was totally unaffected. This outbreak has just had its parallel in America. The horses throughout almost the whole of North America have suffered, and in Ohio pigs were attacked, while men and cattle (and it is said mules) have entirely escaped. The disease commenced in Canada (Toronto?) early in October or end of September; Sir E. Thornton's Report to Lord Granville, says 29th September. It spread with great rapidity to other Canadian cities, then to Buffalo, and appeared in New York about the 20th or 21st October. A telegram of the 26th October states that 300,000 horses were then sick in New York. It visited Boston and many other cities, and passed down even to Texas. The rapidity of its spread seemed to negative the idea of its passage from horse to horse, and to favour the notion of some morbid agent being in the air. It was noticed, however, that the horses in rural districts often escaped, though horses in the country in the neighbourhood of infected towns suffered. At Buffalo it was said that horses from Canada introduced the disease, but for full discussions as to the mode of spread and causation we must wait until the Reports now known to be preparing in America are published.

SECTION II

PARASITIC ORIGIN OF DISEASE.

The origin of diseases from entozoa, or from low forms of life, fungoid or bacteroid, is so important a subject that it seems necessary to give a brief retrospect of what has been done this year, in continuation of former Reports. Of course the recognition of causes of disease of this kind points out the proper preventive measures, or at any rate the direction which our attempts at prevention should take, and hence an etiological discovery, at once has practical results.

The progress of observations seems to make it clear that the true fungi must be separated from the class called schizomycetes by Nægeli and De Bary, which includes the bacteria and allied forms. The true fungi produce, for the most part, very obvious diseases, which are situated on the surface of the body or in cavities easily accessible to the air. The schizomycetes appears in all parts of the body, and have been found in the interior of living cells, and may be thus transported everywhere.

Diseases in Men produced by Entozoa.

Filaria Sanguinis Hominis.—The most remarkable discovery of the year is that of Dr. T. Lewis, Assistant Surgeon, Army Medical Department, in

Calcutta.* He had discovered some years ago, in the urine of persons affected with chyluria, the young of a small worm belonging to the filariæ, and he has now found that this worm exists in immense quantities in the blood, and emerges through the kidneys, and occasionally through other channels, as in one case by means of a discharge from the inner canthus of the eye. The worms are easily detected in the blood, and exist there in great numbers, without apparently causing any marked symptoms, except those arising from their passage into the urine.

Another parasite has been also discovered by an Army Medical Officer, Dr. Welch.† A soldier from India died of phthisis five days after landing at Netley. In the jejunum immediately beneath the mucous coat was an oval prominence like a rice-grain; this was found to be caused by a parasite .13-inch in length and .053-inch in thickness. There was a chitinous investing membrane, and at one end a retractile proboscis with a number of hooklets; there was no mouth or intestines, and no distinct segmentation. This is the first time a representative of the Acanthocephala has been discovered in the human body, though Echinorhynchus are common in birds and fishes. In this man it produced no symptoms.

Dr. Wising, of Stockholm, describes a case of balantidium coli.‡ A man became affected with diarrhoea, and passed thin pea-soup-like stools. Under the microscope there were remains of food, lymphoid cells, blood, and large numbers of small white worms, which were found to be the balantidium coli, described by Malmsten in 1856.

Bilharzia Hematobia.—Dr. Cattell, of the 10th Hussars, who served for five years in Natal, informs me that the endemic hæmaturia is almost confined to boys in the Dutch town of Maritzburg; girls do not suffer, and adults only slightly. At Durban the disease is rare. At Maritzburg the drinking water is taken from open water-courses running along each street, which is often fouled by animals drinking, by ducks, and by surface washings. The boys play in this water, and no doubt drink it in the hot weather. At Durban the water is from wells, or is rain-water; usually the latter. At Maritzburg, during a residence of five years, Dr. Cattell had no case among the soldiers' children. The drinking water for the troops is taken from a separate water-course, higher up than that of the town's supply. No Kaffir boys are affected. Dr. Cattell is impressed with the opinion that the drinking water is the source of introduction.

Fungoid Origin of Disease.

No great advances have been made in this division of the subject. Eidam, in the work afterwards referred to, and Bastian,§ have given summaries of some of the diseases among insects and some other animals, which are caused by fungi, but little is communicated on the fungoid diseases of men. Tilbury Fox has described and figured || the spores and mycelium of the trichophyton tonsurans in dust deposited from the air of schools, in which ringworm is prevailing. He figures also epithelium, with apparently the spores of the fungus in or on it.

Bacteroid Origin of Disease.

Before noticing the diseases which have been attributed to bacteria during the last year, it may be interesting to notice two papers by Oscar Grimm, of St. Petersburg,¶ and also to extract a few passages from a work by Dr. Eidam.** Grimm first discusses the significance of the terms vibrio, bacterium,

* "Eighth Report of the Sanitary Commissioners with the Government of India." Appendix. See also "Lancet" for the drawings.

† "Lancet," November, 1872. An encysted Echinorhynchus in Man. By F. H. Welch, Assistant Professor of Pathology in the Army Medical School.

‡ "Monthly Microscopical Journal," October, 1872, p. 196.

§ "The Beginnings of Life, and Heterogenesis in its Relation to Certain Parasitic Diseases."—"British Medical Journal," February and March, 1872.

|| "Lancet," January 6th, 1872.

¶ "Archiv für Mikroskop Anatomie." Band viii. p. 514, and Band ix, p. 118.

** Dr. Eidam's work, "Der gegenwärtige Standpunkt der Mykologie mit Rücksicht auf die Lehre von den Infektionskrankheiten," Berlin, 1871, will be found very useful to Physicians.

spirillum, &c., and then gives a statement of the effect of reagents on vibriones. Strong sulphuric and hydrochloric acid dissolve vibriones; weak solutions act slowly; acetic acid dissolves them very slowly; chloride of ammonium kills them, and then dissolves them; creosote makes the organisms clearer, and the vacuole is then clearly seen; iodine colours them brown; carmine red; alcohol and ether slowly dissolve them. All the tests show that they are formed of a substance like protoplasm; they are indifferent to the electric current. Grimm describes their movements and their still conditions very carefully. Like other observers, he was not at first able to see the cleavage of vibrios, but he at last succeeded in doing so in both vibrios and spirillum; and he also observed a very interesting phenomenon, viz., the conjugation or union of the one-jointed vibriones, and their fusion into a two-jointed link; and subsequently the union of other vibriones, so as to form a many-jointed rod. This union or copulation has been seen in the bacteria of the splenic apoplexy, and in the spirillum undula. He therefore remarks that the single joint is the individual and not the chain of rods. With respect to the origin of the splenic apoplexy, or carbuncular (milz-brand) bacteria, Gurin believes that they are developed out of the protoplasm of the white blood-cells.* He asks the question, are the germs of the vibriones then present in these blood corpuscles? If so, they are so minute as to be undiscoverable.

Grimm considers the spirillum volutans to be only the union of two samples of spirillum undula. So also bacterium enchelys can form long chains, and produce vibrio rugula or vibrio bacillus. These two last-named vibrios are distinguished only by the size of the joints. He has seen all intermediate forms between vibrio lineola and vibrio subsilis. In fact he doubts whether any distinction can be drawn between the different kinds of vibrios, and he recognizes indeed only two forms, viz., spirillum and vibrio. He includes under the term vibrio, the genera vibrio and bacterium of Ehrenberg. He describes, however, a new form, which, if it is really a vibrio, would constitute a third genus. Grimm has satisfied himself that the vibriones need atmospheric air as nutriment, and also that they are nourished by the absorption of fluid. He has seen them attack spores, and acquire a green colour, while the contents of the spores were much lessened in amount. He has seen the vibrios take on in the same way a red colour from a red fluid which they fed on; and when the nourishment was colourless, the vibrios were also without colour.

With regard to the systematic place of the vibriones, he is inclined to put them by the side of the phytochromaceæ, which resemble the vibriones in structure, in their increase through simple division, in their movements, and lastly in the formation of colonies, with separation of a gelatinous mass. Some single oscillarineæ, however, resemble vibriones so much that they are distinguished with difficulty. Although there is this resemblance there is no identity.

He agrees with Cohn, that "the phycochromaceæ may well have been "the first organisms on the earth, as they only can grow in hot, strongly-saturated saline solutions. I think that these organisms, whose joints may "be considered either plants or animals, divide into two branches, from which "the formation of the animal and vegetable characters takes its rise."

The second author, Dr. Eidam, analyses with great care the micrococcus theory of Hallier, and his doctrines of infectious diseases; and then passes in review the objections taken by De Bary and Hoffmann to Hallier's assertions, and states also the views of Karsten and Bonorden on fungoid development. He sums up his own conclusions in terms as follows:—Very important differences of opinion now exist among mycologists. Bonorden denies all alternation of generation among fungi; De Bary takes a middle course on this point; and Hallier makes the greatest possible use of metamorphoses, and his theory is indeed otherwise impossible. In no other natural science are the differences of opinion greater than in mycology.

As regards the infectious diseases, it is extremely probable (ausser ordentlich wahrscheinlich) that they are caused by fungi or similar bodies.

If it could be decidedly made out that the plasma of spores and mycelium

* "Op. Cit." Band viii. p. 525. He alludes to confirmatory observations of Gobulew and C. A. S. Schultze (p. 527).

disintegrated in order to form micrococci, and if these little granules could increase, and under favourable circumstances could go on to new plants, the present cell theory would be greatly changed. The micrococcus theory has one support: the spores of peronospora, cystopus, &c., divide their contents into globular balls, which individualise themselves more and more in order finally to take the form of swarms which burst the spore-coats, and these swarms can bud and develop. If in these spores of large size there is such a division of plasma, and a further development of the parts so arising, cannot something similar occur in other spores?

The difficulties of experimenting are immense. In cultivating the products of disease, only fresh and bacteria-free substances must be used; blood taken (with all precautions) direct from the body is the best. Nevertheless, in almost every sample of healthy blood, there are many little corpuscles, with dancing movement, which it is impossible to distinguish from micrococci. Eidam proceeds to point out the other great sources of fallacy in cultivation experiments, and finally concludes that the micrococcus theory has almost everything against it. It may indeed be questioned, he says, if, on account of their excessive minuteness, these objects can be dealt with with our present instruments, and if it is possible at present to close this controversy. Perhaps even our whole method of investigation may be wrong, and renewed investigation is certainly indispensable.

It will be seen, then, that the impression made upon an observer of great authority is that the question is at present impossible of solution, as far as the micrococcus theory is concerned, but on the whole he is adverse to this theory. At the same time he is impressed strongly with the opinion that the infectious diseases are of parasitic origin, and are caused by fungi or some similar growths. In reviewing the observations made during the last year, it will be seen how far fresh evidence has been brought; but the conclusion must still, I think, be that we must yet hesitate before considering the parasitic theory of infectious diseases has been established.

(a) *Specific Diseases supposed to be caused by Bacteria.*

The evidence which has been brought forward during the last year on this subject is interesting in a high degree. As regards cholera, the careful observations of Drs. Lewis and Cunningham, in Calcutta, seem to have disproved the possibility of either fungi or bacteria being the cause of cholera. In last year's Report I gave the evidence of D. D. Cunningham in respect of the discharges, which agreed with that of Lewis on the same point, as showing no such plants as constant constituents. This year both observers have published a joint Report* on the blood in cholera. When the fresh blood was examined in 128 instances, with very high powers (1-25th of Powell and 1-12th immersion lens of Ross), no fungoid spores or bacteria, or anything which could be referred to either class, was found; and when the blood was kept, bacteria only appeared in a small number of cases. As far, then, as these fluids (the intestinal discharges and the blood) are concerned, it appears that these high powers failed to detect fungi or bacteria, and that it is in the highest degree improbable that either were present and undetected.

Very different is the case of some other diseases, if the observations of several observers, and especially of Professors Coze and Feltz, of Strasbourg, may be trusted.† They assert that in the blood of septicæmia, typhoid fevers, and puerperal fever, there is present a linked or chained bacterium, which they term (after Dujardin) *Bacterium catenula*, and they believe that the growth of these bacteria is the efficient cause of these diseases; indeed they go further, and assert "that every infectious substance is of bacteriferous nature." (p. 18), although the form of the bacteria is different in small-pox, scarlet fever, and measles from what it is in typhoid. The activity and specificity (to coin a word) of bacteria arise they conceive, not because they are the carriers of a special

* "Eighth Report of the Sanitary Commissioners with the Government of India." Appendix.

† "Recherches sur les Maladies Infectieuses. Par L. Coze et V. Feltz, Professeurs à la Faculté de Médecine de Strasbourg, 1872.

soluble principle, but from the rapidity of their multiplication; the form and size of the bacteria depend on the soil in which they are reproduced and multiplied. The various phenomena of the infectious diseases are supposed to be dependent on pathological localization, and these localizations arise from the rapid growth of bacteria; from the detritus formed from them when dead; from the leucocytes which are often simultaneously developed in excess, and from fibrillary deposits of fibrine.

The authors attempt to prove these assertions (which, if correct, would largely modify our views of infectious diseases) by microscopic examination, by experiments, and by clinical observations. In their microscopic inquiries they employed Nacht and Verick's glasses (immersion and otherwise), and have worked up to 1,600 diameters, and they used distilled water, the steam of which had passed through a red-hot porcelain tube. The diseases treated of are pyæmia and septicæmia, typhoid fever, small-pox, scarlet fever, measles, and puerperal fever. They also give a chapter on the cultivation of infusoria and on the nature of bacteria. They distinguish between septicæmia from pyæmia, as is now usually done, though the two are often mixed.

With respect to septicæmia the authors showed, in 1866, that the blood of animals infected with a poisonous liquid is itself infectious, and that the red globules of the blood are then altered, and a multitude of bacteria, &c., exist, and that in successive inoculations death ensues more and more rapidly, so that the infectious element seems to gain in activity as it passes through the same organisms. They now support these operations by numerous experiments on rabbits, which are, on the whole, strongly confirmatory of those made by Burdon-Sanderson, and presently to be recorded. Passing over the changes they describe in the red globules, in the white cells, and in the fibrine (fibrillary deposits), and referring only to the infusoria, they found always single, double, or multiple corpuscles, usually in chains, but looking like little worms. Sometimes they saw the whole element with its greyish or slightly yellowish colour; sometimes merely a pale or blackish point (according to the illumination), which was owing to an element seen from above and presenting one end; these points measured $\cdot 0016$ mms.; the complete elements $\cdot 004$ to $\cdot 02$ mms. in length and $\cdot 066$ mms. in thickness. They had little activity and resembled bacteria rather than vibriones. They die in the body, and especially in the lungs. The cause of death in septicæmia is considered to be a profound alteration of the blood, tending to, but not usually reaching putridity, and induced by the countless myriads of bacteridia.

In pyæmia there is also often the presence of bacteria, but because there is usually coincident septicæmia, there is in addition or alone numerous embolisms arising from substances introduced mechanically into the circulation (pus, white globules, substances from inflamed veins) and these may exist without any bacteria. The authors thus draw a broad line between the two affections.

In typhoid fever, experiments were made with blood taken from human typhoid patients and injected into the blood of rabbits; an infectious disease (with implication of Peyer's patches) was given to the rabbits, whose blood was able to communicate the disease to other rabbits. The dried and powdered blood of an infected rabbit preserved its power to produce infection for more than a year. In the blood of men and rabbits there were (in addition to alterations in the red and also largely in the white globules) a great number of bacteria, smaller in size than in the septicæmic blood; they were often divided, as in septicæmia, into three, four, or five segments (*B. catenula*).

The evidence of the presence of bacteria in typhoid blood seems to be complete, but it is, of course, still an open question whether they are the cause of the typhoid fever, and it even appears from some of the *post-mortem* histories that bacteria were not always found in the blood. The examinations of typhoid blood during life appear also to have been very few in number.

With regard to small-pox, the observations of Chauveau and Sanderson have proved that the infectious property resides in the solid glistening particles. Whether these glistening particles are bacteroid or not is a matter of dispute. Beale, their discoverer (in 1865) considers* that in vaccine lymph they consist "of a peculiar kind of living matter, the smallest particle of which when

* "Disease Germs." 2nd Edition.

"supplied with its proper pabulum, will grow and multiply." Variolous pus contains similar particles, and in both cases they are portions of bioplastic matter. Three years afterwards Keber described inconceivably minute organic corpuscles in variolous blood, in which a lively cellular growth took place, and Hallier and Zurn have observed similar particles in the lymph of the sheep-pox as well as in human small-pox. Dr. F. Cohn* has now convinced himself that these particles are "living uni-cellular organisms belonging to the group of the so-called "globular or sphere bacteria (*Kugel bacterien*). He considers that he has absolutely proved this, and details his method (which is based on that of Burdon-Sanderson) by which he believes he has excluded all chance of foreign admixture. The appearances of vaccinal and variolous lymph were identical; there were numerous extraordinarily small globular particles with no proper movement, but with only molecular movement; they were easily overlooked, as their refraction power is the same as that of serum. The immersion lens finds them most easily; their size is under .001 mm., perhaps about one-half or three-quarters of this size; there are some larger bodies which Cohn takes to be clearly cells. At first the molecules are separate, but they hang together like a figure of 8; these double cells increase after a short time, and there may be four or more hanging together and forming chains, and in one or two hours there are chains of eight divisions and sarcina-like bodies are formed, and then all sorts of groups appear. These bodies Cohn considers to be the same as the micrococci of Hallier, but he does not desire to use this word which may give rise to misconception, and proposes the name of "micro-sphæra" as identical with "*Kugel-bacteria*," and places them of course in the family of the schizomycetes. With respect to the question whether these "micro-sphærae" are the bearers of the contagion, Cohn alludes to Chauveau's investigations and considers it is most probable that the question must be answered in the affirmative.

The authority of Ferdinand Cohn in a matter of this kind is so great that it would seem we must admit that the small points described first by Beale are really bacteria; at the same time Beale has worked with such high powers and is so expert in these investigations that a further inquiry may perhaps still be demanded before Cohn's view is definitely admitted.

Coze and Feltz state that they found articulated bacteria in immense quantities in the blood of the human subject attacked with small-pox, and, on injecting this blood into rabbits, they produced feverishness and bacteria similar to those in the variolous blood which were found in the rabbit's blood. In variolous blood they have also found round globules armed with points, which they considered to be bacteria fixed to a globule. They also noticed many deposits of fibrine, as in typhoid fever. The kind of bacteria, they state, resembled the *B. bacillus* of Pasteur and the *B. termo* of Müller, and are quite different in aspect from those of septicæmia and enteric fever. As in septicæmia, the transmission of the virus through successive rabbits seemed to heighten the virulence of the poison.

In scarlet fever blood these authors have also found bacteria which, when transported into the system of rabbits, largely increased in size. In man their length was .0006 mms. and their breadth .0002 mms.; in the rabbit they were eight times as big. The injection of human scarlatinal blood into rabbits produced a fatal feverish disease.

In measles, extremely small and mobile bacteria were found, but the blood of measles was not toxic to rabbits. The authors state that the blood taken from the part of the skin covered with eruptions contains many more bacteridia than the blood taken from the sound part of the skin and believe therefore there is a connection between the eruption and the number of bacteroid elements; in other words, we presume that they mean to affirm a great local development of bacteria in the vessels of the skin.

In the blood of puerperal fever, the authors found (in all infectious diseases) the following changes: deformed red globules, augmentation of leucocytes, fibrillary deposits of fibrine and chains of bacteria, and the same characters were found in the blood of rabbits poisoned with injection of puerperal fever.

* "Virchow's Archiv." Band 55, p. 229. 1872.

The observations of Coze and Feltz on septicæmia* are strongly supported by the beautiful experiments of Burdon-Sanderson, and Klein, and by the observations of Kleb's, of Davaine, and several others. Sanderson and Kleinf have found bacteria in septicæmic and pyæmic blood, and have also confirmed in another way the curious observation of Coze and Feltz, that by successive inoculations the virus increases in intensity. If a pyæmic fluid is transferred to the peritoneum of a guinea pig, and is allowed to remain there for a couple of days, and is then introduced into another animal, its toxic power has so increased that it has acquired the most deadly activity. "All such extremely active liquids were crowded with bacteria of a peculiar character, the increased number of which seemed to be in proportion to their toxic properties."

Dr. Sanderson believes that bacteria "afford a characteristic, by which we may distinguish the products of infective inflammations from those which are non-infective, and that their number affords an indication of the degree of infectiveness." Dr. Sanderson, however, believes from actual experiment, that the ordinary bacteria of putrefaction have no toxic action, and he is not prepared at present to say that the bacteria of septicæmia are the toxic agents; he regards them as the inhabitants of infective fluids, and as very probably carriers of infection.

The work of Klebs,† which is based on observations in Carlsruhe, during the war of 1870-71, is remarkable in various surgical aspects, but in none more than in the statements made as to the chief cause of death after wounds. He notices (p. 106 *et seq.*) that the differences in the amount and fatality of wound-fevers, and pyæmia and septicæmia cannot be dependent on the physical condition of the pus, for it is of all kinds of fineness and coarseness. A fine microscopic examination has convinced Klebs that the cause of secondary pus formation lies in the presence of "putrefaction fungi," (Fäulnisspilzen) which he terms microsporon septicum. He confirms entirely the statements of Recklinghausen and Waldeyer, and though he does not allude to him, his observations seem confirmatory of Lister's. The method in which it is sought to prove that this parasite is a pus and fever-making cause is two-fold; an anatomical and a physiological. With regard to the first, the microscopic examinations showed bacteria, vibriones, and monads in almost all cases of wound-secretions; the bacteria are often motionless, rod-like bodies, often joined together, so as to form long-jointed fibres; there were also numerous microspores, that is extraordinarily small glistening particles, either free, and then having oscillatory movement, or in groups (zooglæa-form), or in chaplets. These bodies are found in good as well as bad pus; but are sometimes wanting in good pus. These parasites are, Klebs thinks, the same as those described by Hueter and Tommasi in the diphtheritis of fresh wounds. Commencing in the secretion on the outer surface, the parasites attach themselves to the soft parts, and colonize there, and form zooglæa-masses, just as they may be artificially grown on the mesentery of the frog.‡ The colonies extend themselves on all sides, unless they meet with a cleft, which interposes a chasm or produces mechanical compression which destroys them. They destroy the surface in this way, and then they penetrate into the lymph and blood-vessels and get to the inner organs. Sometimes they eat through the wall of a vessel from outer to inner coat, and getting into the vessel cause coagulation. Of the parasite many penetrate into soft tissues, which they easily destroy, though the hard bones and tendons resist them. They penetrate into the interstices of the loose connective tissues either directly, or are assisted by those forces which aid in moving the lymph.

* Coze and Feltz have also made some spectroscopic observations on the blood of septicæmia which shows some differences from healthy blood, but their causes are not made out. They have also tried to cultivate bacteria but have never succeeded in obtaining any fungoid forms, and their observations on this point are quite opposed to Hallier's statements.

† "British Medical Journal." May 11th, 1872.

‡ "Beiträge zum Pathol. Anat. der Schusswunden." Von Dr. E. Klebs. Leipzig, 1872.

§ Klebs has seen this process in decaying teeth; the zooglæa masses penetrate into the bony canals.

This latter mode is very important. When the parasite passes into the connecting tissue interspaces the permanent cells are destroyed by the mechanical pressure; but in the spaces are found wandered white cells; the parasites pass into these wandering cells (which have come from the wound surfaces apparently, and contain often hæmatoidin, p. 112), and then are traced into the lymphatic glands. A general infection of the system occurs very slowly in this manner, and the spread of the parasite-holding cells beyond the lymphatic glands is very difficult to prove. The parasite arrives in the muscles from the connective tissue spaces; then during the contraction of the muscular fibres, the spaces between them are widened, and neighbouring fluids are drawn by aspiration into the spaces; in the succeeding period of muscular relaxation the solid particles in the fluid are not driven out again; then occurs the well-known interstitial myositis and pus building.

The general infection of the body arises most commonly by the infection of the blood, and the transference to various parts; the little thromboses which are found behind the valves in the veins are caused by the adherence of the microspores to the walls; by their colonization and growth there, and by the irritation and pouring out of a fibrino-plastic substance on the walls, a coagulating influence is executed on the blood, and perhaps also the anti-coagulating influence of the walls pointed out by Brücke, is removed. These thromboses may remain on and often form pus. Then the organs suffer; the lungs especially, from the mechanical arrest of numerous solid parts, or sometimes from coagula in the vessels.

Klebs enters at considerable length into the thrombosis and coagulation in the lung vessels in septicæmia, and then passes to the hepatic abscesses, which seldom arise from emboli, but from the distribution of the microspores in the capillary vessels, which are distended, press on the liver cells and destroy them. Klebs concludes that the opinion which looks upon these parasitic elements as merely unessential and accidental attendants of suppuration and inflammation, must be given up, as complete proof has been obtained that the local mycosis precedes these processes. But in addition, Drs. Zahn and Tiegel have succeeded in filtering the parasitic masses. The clear fluid caused heavy but transient fever, but never caused local suppurations; the same fluids containing the parasites caused extraordinary wide-spread suppurations. Zahn's experiments have, however, been doubted.

Finally, in the splenic apoplexy, or carbuncular diseases (Milz-brand) of sheep and cattle, in which bacteria were discovered by Brauell, Davaine, and others (see report in vol. 8, p. 312), it has been asserted by Dr. V. Grimm, of St. Petersburg, that no bacteria were found in the blood during life. But this has been contradicted in a note by Dr. Semmer, of Dorpat,* who not only from his own observations, but from those of Unterberger, in Dorpat, and Nayloraki, in St. Petersburg, entirely confirms Brauell's statement of the constancy of the occurrence of these bacteridia in the blood of carbuncular disease.

All the above noted affections belong to the strongly-marked class of infectious diseases; but some observations have also been made on fatal cases, which are allied to these infectious disorders.

(b) *Non-specific Diseases attributed to Bacteria.*

Mycosis Endocardii.—Under this term, Professor Winge, of Christiana, described in 1869,† a case of ulcerous endocarditis, in which there were numerous fungoid filaments on the several valves, and in the little embolic masses which were found in the heart. The vegetations were like fibrinous threads, but under an immersion-lens their characters came out clearly; there were partitions, and the threads were branched. There was detritus and granular heaps, very similar to bacteria rods, while the threads were like leptothrix-mycelium. The case came on after the man had opened a suppurating corn, with repeated shiverings, followed by severe headache, diarrhoea, and typhoid-like symptoms.

Another case of a similar kind is now recorded by Professor Heiberg, of

* "Virchow's Archiv." Band 55, p. 251. 1872.

† "Jahresbericht für die Ges. Med." for 1870. Band 2, p. 95.

Christiania.* It was the case of a puerperal woman, who, on the 10th day, had shivering and vomiting, followed by swellings in some joints, and vesicles on the skin of the extremities. She died in about five weeks. On *post-mortem* examination there was ulcerous endocarditis, and thrombosis of the mitral valve, with fungoid growth. There were metastatic abscesses; metro-lympho thrombosis, and lungœdema and hyperæmia. On a microscopic examination of the cardiac valves, and of the coagula adhering to the chordæ tendinæ, there were numerous fine granules, and many rod-like bacteria—similar bodies, and leptothrix chains. There was no fibrine, but many white corpuscles in the thrombus masses. The chains and links entirely agreed with those observed in Winge's case. The author gives reasons why, in both cases, the plant could not have been a *post-mortem* appearance; but that they were developed *intra vitam*. Detached portions of the vegetation produced emboli.

The plant is referred to the schizomycetes (of de Bary), and not to the true fungi.

A sample was transmitted to Virchow, who considers the granules decidedly of parasitic nature, and to be vibrional. The case is very similar to two described by Virchow† of puerperal ulcerous endocarditis, and in which also there were peculiar granules in hyaline connecting masses, and which Virchow identified as parasitic.

Diphtheritic Nephritis caused by Schizomycetes.—Dr. Letzerich describes‡ a case of diphtheritis of both tonsils, and swellings in the neck, in a child of 2½ years old, which was followed by suppression of urine and death. On examination, the renal tubules (straight and contorted) and the Malpighian corpuscles were found crowded with the spores of a fungus; where the fungoid masses were most numerous the epithelium had disappeared, and the fungi lay close to the basement membrane. The canals were greatly enlarged by their pressure, and the vessels compressed. If the epithelium still existed it was crowded with spores, and often enlarged to double its natural size. No fungi were found in the spleen or liver; but they were present in the arteries of the kidneys. The cessation of the urinary secretion was purely mechanical. Although the writer uses the term fungus (pilus), his figures only show small round cells like spores certainly, but which might possibly be bacteroid.

Uterine Diphtheritis and Bacteria.—Waldeyer§ describes four cases of puerperal fever, with diphtheritic exudation on the internal surface of the uterus; this layer and the contents of the lymphatics, the co-existent peritoneal, pleuritic, and pericardiac exudations were found to contain masses of bacteria between the pus corpuscles and the mortified tissues, and bacteria were found even in the pus corpuscles. The form was the "kugel-bacteria" of Colin (already noticed). While Waldeyer does not lay an extreme weight on these appearances, he considers they cannot be indifferent, and refers to the nephritis bacteritica of Klebs and Recklinghausen.

His observation on the presence of bacteria within pus cells is confirmatory of Beachamp's and Estor's observations, and of Bastian's remark on the presence of bacteria in living cells.||

Bacteria in the Vessels of the Brain.—In a case of rheumatic fever, which died with an excessively high temperature, Bastian found outside and in the central vessels (surface of convolutions), a large number of actively moving particles; many of these were distinct and large bacteria, made up of "two almost cellular segments."¶ Bastian says these bacteria must have existed in the blood during life, or have been produced in the vessels after death, and before the skull was opened. He inclines to the latter opinion, and states that it influenced him in his views of spontaneous generation. But there are now so many cases of bacteria in the blood during life that it seems much more probable there was some "foyer" which furnished those found in this rheumatic case.

* "Virchow's Archiv." Band 56, p. 407. 1872.

† "Ges. Abhandlungen," p. 709.

‡ "Virchow's Archiv." Band 55, p. 324. 1872.

§ "Centralblatt für die Med." Wiss., 1872. No. 16, p. 252.

|| "British Medical Journal." March, 1873.

¶ "British Medical Journal." March 9, 1873.

APPENDIX No. II.

THE RELATIVE POWER OF SOME REPUTED ANTISEPTIC AGENTS.

By Surgeon-Major O'NEAL.

THE following experiments were made at Dublin, Athlone, and Netley, for the purpose of ascertaining the power of certain reputed antiseptic agents.

To effect this purpose with accuracy, it became necessary to select some test fluid, which could be always obtained in the same condition, and containing the same amount of organic matter. In fact, a fixed standard, by which the power of each antiseptic might be tested, and its value, in relation to other antiseptics, accurately ascertained, by reference to a common standard, as the relative value of articles of commerce is ascertained by referring them all to the common standard money.

At first sight, sewage appeared the most obvious thing to use as a test, being itself that to which antiseptics are most commonly applied. But, as the experiments would necessarily be extensive, and would require to be frequently repeated, it would be obviously impossible to have all, or indeed any two of the specimens of sewage, used in exactly the same condition, and any difference whatever would lessen that accuracy, which has been a primary object in these experiments. If, for example, the particular specimen of sewage used for testing carbolic acid, happened to contain a larger proportional amount of organic matter than that used for chloralum, the latter would be allowed a considerable advantage over the former, in estimating their respective antiseptic powers.

A perfectly fresh infusion of beef was selected as a test fluid, easily managed, and which could be obtained, at all times, of the same strength of organic matter.

The method of conducting the experiments was as follows:—

An infusion was made of lean beef, in warm distilled water. This was cooled, and when cold filtered, the object being to get rid of the fat, the presence of which might interfere with the uniformity of the fluid. A few globules of fat more in one vessel than another, giving a larger proportion of organic matter, would of course affect results; of this filtered infusion, a quantity was measured accurately from a burette into a platinum vessel, was evaporated, weighed, incinerated and weighed, and the amount of decomposable organic matter it contained thus precisely ascertained.

It was arranged so that the infusion should be always strong enough to bear dilution, and its amount of organic matter being ascertained, as above detailed, a simple calculation gave the quantity of distilled water necessary to be added to each separate infusion, in order to dilute them all down to the one uniform standard of 0.5 grammes of organic matter to 100 c.c. of water.

A quantity of the agent to be experimented on was then weighed, dissolved in an accurately-measured quantity of distilled water, and passed from a burette, in the necessary quantities, into a series of clean, wide-mouthed glass jars. To each of these were added such quantities of the beef infusion as were necessary to give the proportions detailed in Table A.

Where the agent was not sufficiently soluble in water, the quantities required were separately weighed, made into a paste, with a small quantity of distilled water, and then thoroughly mixed with the beef infusion.

One of the jars contained beef infusion alone, as a standard of comparison.

The whole were then placed in a press in the laboratory, freely exposed to air, and to a moderate light; but not at all to the direct action of the sun.

All the antiseptics experimented upon were thus subjected to exactly the same conditions, with the exception of temperature.

A self-registering thermometer was, however, left in the press, and the results of its readings are given in Table A.

The contents of each glass were examined daily by a microscope, with a power of one-eighth the observations noted, and the results condensed in Table A.

A preliminary experiment was made with the following agents, namely :—

1. Thymol.
2. Zylol.
3. Chloride of calcium.
4. Sodium chlorate.
5. Potassium chlorate.
6. Sulphate of zinc.
7. Magnesium chloride.
8. Calcium bi-sulphite.
9. Chloralum.
10. Chloride of aluminium.
11. Chloride of zinc.
12. Permanganate of potassium.
13. Sulphate of copper.
15. Bi-sulphite of sodium.
16. Carbolic acid.
17. Bi-chromate of potassium.

The result of this experiment was to show that the first eight had little or no power, and they were therefore dismissed from further consideration, after the correctness of this conclusion had been confirmed by repetition of the experiment.

The two first agents, thymol and zylol, were tried because they were at the time used in Dublin, in the treatment of small-pox. They had the reputation obtained, I believe, from Germany, of being powerful remedial agents in this disease through exercising an antiseptic influence on the blood. Their use was, however, shortly discontinued, as they were found to be of no practical value.

During the course of the observations it became manifest that the progress of decomposition might, for the consideration of the comparative practical value of the several agents, be conveniently divided into four stages, namely :—

1. From the commencement of the experiment, to the observance of the first animalcule in independent motion.
2. From this point to the existence of bacteria, &c., in abundance.
3. From the latter point to the first perception of a putrescent smell.
4. To the point when the specimen became so offensive as to require to be thrown away.

It is not pretended that these stages are distinctly marked; on the contrary, the decomposing fluid passes gradually, and more or less slowly, from one to another. They are, however, useful in considering the value of antiseptic agents in the different objects for which they are used,—medical, surgical, and sanitary.

In medicine they are administered internally, with the object of exercising, after absorption, into the circulation, an antiseptic influence on the blood as in the case of thymol and zylol for small-pox, and sulphites by Professor Polli in various diseases. But these experiments show, that even in the proportions of equal parts of the agent to organic matter, they do not altogether prevent the development of animalculæ, and cause one to doubt the possibility of introducing into the system an amount of any antiseptic sufficiently large to bear to the organic matter of the blood, such a proportion as would exercise any material influence on disease germs contained in it.

A different conclusion may be drawn when the agent is used externally.

In the case of carbolic acid, for example, animalculæ were not abundant before the ninth day in the experiment in which it was used in the proportion

of one to twelve. When employed as a lotion to an ulcer or wound, the decomposable matter against which it would have to contend would be the organic matter contained in the secretion on the surface of the ulcer, and however weak the lotion might be, it is probable that the amount of carbolic acid actually applied would be much greater than that of the organic matter.

These experiments, therefore, whilst showing that carbolic acid is not a very useful agent for sanitary purposes, do not at all affect its character as a direct local application in surgical practice.

Intermediate between these is the case in which an agent is administered internally, with the object of producing a direct local action.

It will be seen from Table A, that sulphate of copper, when used in the proportion of one to twelve retards decomposition so that animalculæ do not become abundant before the fifth day, and smell is not perceived before the twenty-first day. Probably the beneficial influence of this agent in the diarrhoea of typhoid fever is not confined merely to its action as an astringent; but is due also to its antiseptic qualities. Acting as a direct preventative of decomposition in the contents of the bowel, it removes, or lessens the amount of septic matter liable to be absorbed by the lower portion of the canal.

It is, however, from a sanitary point of view, that the action of the agents experimented upon are under consideration here.

It appears practically impossible to employ any of the agents for the treatment of sewage in such proportions as would altogether prevent the development of animalculæ, and it becomes necessary to consider their relative value from the points just short of the second and third stages in Table A: that is, the proportions in which they would prevent the development of animalculæ in abundance for a given period, say ten days; and again in which they would prevent putrescent smell for the same period.

In all the experiments, animalculæ having distinct (however feeble) motion were observed to be present on the second day. This was distinctly ascertained, by repeated trials, to be the case, even with the most powerful of the agents, bi-chromate of potassium.

Chloralum appears to be an agent of little power, as when employed even in so large a proportion as one part to two of organic matter, animalculæ became abundant on the fifth day, and putrescent smell commenced on the seventh. Its price is low, but this does not appear to compensate for its want of power.

Chloride of Aluminium.—In the experiment with this agent, animalculæ became abundant, before the tenth day, in those containing six parts of organic matter, and putrescent smell in those containing eight parts. In the proportions of one, two, and four, fungi were developed in great abundance, and there was a musty but not offensive odour. The agent is expensive, and of no practical value.

Chloride of Zinc.—With this agent animalculæ became abundant on the sixth day, in the proportion of one to two of organic matter, and putrescent smell was observed on the thirteenth day, in the proportion of one to four. In lower proportions fungi were abundant. In addition to its want of power, this agent is costly.

Permanganate of Potassium appears from Table A to have considerable power as a decolorant, but hardly any as a germicide. The experiment lasted a month, and, though, no smell was observed in those from fourteen parts of organic matter downwards, they literally teemed with bacteria vibriones, &c., after the eighth day, even in the experiments containing equal parts of the agent and organic matter.

Sulphate of Copper was under observation for six weeks. Animalculæ became abundant on the sixteenth day in the experiment containing four, and smell was noted on the twenty-first day in that containing twelve parts of organic matter. Those containing a lesser amount remained free from smell throughout, but fungi were developed abundantly in all, except that containing equal parts, which remained free from smell and fungi, showing only a very few animalculæ in feeble motion.

Bi-sulphite of Sodium is of no value. In the experiment containing four parts of organic matter, animalculæ were abundant on the fourth day, and putrescent smell was observed on the tenth. In an equally short time fungi became

abundant in the lower proportions, and the higher ones ran rapidly into putrescence.

Carbolic Acid (Calvert's No. 2).—In the experiment containing eight parts of organic matter, animalculæ became abundant on the tenth day, and in that containing six parts not till the twenty-third. Putrescent smell was observed on the twelfth day in that containing twelve parts. There was a very slight development of fungus in the one containing six parts, but in none of the others. Those containing four parts and less of organic matter showed, throughout the experiments, animalculæ in distinct and tolerably active motion, but they never became abundant. No fungi were formed, and no putrescent smell was developed.

Bi-chromate of Potassium.—In the first series of experiments this agent was tried up to thirty parts of organic matter, and was under observation for thirty-nine days. The agent having resisted up to this point, a second series, in higher proportions, was commenced, and was still going on when this paper was written on the twenty-fourth day. As with all the other agents, animalculæ having distinct independent motion were observed on the second day. In the first series these were few and their motion feeble, requiring occasionally several examinations before being satisfactorily made out; but in the higher proportions, in the second series, they became gradually more numerous, and, in the proportion of one to one hundred and fifty, reached the point of abundance on the eleventh day, and developed slight smell on the twenty-first day. In the experiments containing six parts and less of organic matter there was no fungus. From this proportion upwards it gradually increased, and became abundant at an early date in the higher ones.

This is the most powerful of all the agents tried. It appears quite equal to carbolic acid in preventing the development of fungi, and is much superior to it and all the others in limiting (none of them prevent altogether) the development of animalculæ. It is also by far the most powerful as a deodorant.

TABLE A.

1st Series

	Agent 1 Organic Matter 1			Agent 1 Organic Matter 2			Agent 1 Organic Matter 4			Agent 1 Organic Matter 6			Agent 1 Organic Matter 8			Agent 1 Organic Matter 10			Agent 1 Organic Matter 12		
	Animalculæ.			Animalculæ.			Animalculæ.			Animalculæ.			Animalculæ.			Animalculæ.			Animalculæ.		
	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.
Chloralum	2	...	...	2	5	7	2	5	5	2	3	6	2	3	6	2	3	5	2	3	5
Chloride of Aluminium ...	2	...	...	2	31	...	2	12	23	2	5	13	2	4	7	2	4	7	2	4	7
Chloride of Zinc	2	...	...	2	6	...	2	4	13	2	4	7	2	3	7	2	3	7	2	3	7
Permanganate of Potash ...	2	8	...	2	8	...	2	8	...	2	7	...	2	7	...	2	7	...	2	7	...
Sulphate of Copper	2	...	...	2	...	...	2	16	...	2	16	...	2	8	...	2	5	...	2	5	21
Bi-sulphite of Soda	2	...	...	2	8	...	2	4	10	2	3	6	2	3	6	2	3	6	2	3	6
Carbolic Acid (Carvert's No. 2)	2	...	...	2	...	...	2	...	...	2	23	...	2	10	...	2	9	...	2	9	12
Bi-chromate of Potassium ...	2	...	...	2	...	...	2	...	...	2	...	...	2	...	...	2	...	...	2	...	...

2nd Series

Bi-chromate of Potassium	Agent 1 Organic Matter 60			Agent 1 Organic Matter 120			Agent 1 Organic Matter 150		
	Animalculæ.			Animalculæ.			Animalculæ.		
	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.	Presence.	Abundance.	Slight.
	2	...	...	2	...	...	2	11	31

TABLE A—continued.

3rd Series.

	Agent 1 Organic Matter 14			Agent 1 Organic Matter 20			Agent 1 Organic Matter 24			Agent 1 Organic Matter 30			Beef Infusions 0.5 grains to 100 c.c.			Temperature.	
	Agent 1 Organic Matter 14			Agent 1 Organic Matter 20			Agent 1 Organic Matter 24			Agent 1 Organic Matter 30			Beef Infusions 0.5 grains to 100 c.c.			Temperature.	
	Agent 1 Organic Matter 14			Agent 1 Organic Matter 20			Agent 1 Organic Matter 24			Agent 1 Organic Matter 30			Beef Infusions 0.5 grains to 100 c.c.			Temperature.	
	Agent 1 Organic Matter 14			Agent 1 Organic Matter 20			Agent 1 Organic Matter 24			Agent 1 Organic Matter 30			Beef Infusions 0.5 grains to 100 c.c.			Temperature.	
	Presence.	Abundance.	Smell.	Presence.	Abundance.	Smell.	Presence.	Abundance.	Smell.	Presence.	Abundance.	Smell.	Presence.	Abundance.	Smell.	Highest Maximum.	Lowest Minimum.
Chloralum	2	3	5 8	2	3	5 8	2	3	5 8	2	3	5 8	2	3	5 8	53	40
Chloride of Aluminium	2	4	7 15	2	4	6 12	2	4	5 12	2	3	5 12	2	3	4 12	51	44
Chloride of Zinc	2	3	7 26	2	3	6 24	2	3	6 20	2	3	6 17	2	3	5 8	53	40
Pernmanganate of Potash	2	6	...	2	6	17 ...	2	4	5 14	2	3	4 14	2	3	4 11	51	44
Sulphate of Copper	2	3	15 ...	2	3	9 ...	2	3	7 21	2	3	6 21	2	3	4 12	53	40
Bi-sulphite of Soda	2	3	5 11	2	3	5 11	2	3	5 11	2	3	5 11	2	3	5 11	56	32
Carbolic Acid (Calvert's No. 2)	2	5	11 16	2	4	11 15	2	4	10 15	2	4	10 14	2	3	6 13	51	46
Bi-chromate of Potassium	2	...	...	2	...	...	2	...	...	2	...	...	2	3	6 13	51	46

The word "animalcula" is used as a convenient term for organisms having independent motion and includes "Microzymas," "Bacteria," "Vibrios," &c.

APPENDIX No. III.

REPORT TO THE ASSISTANT QUARTERMASTER-GENERAL,
MYSORE DIVISION, ON THE CAUSES OF ENTERIC FEVER
[AT BANGALORE.]

By Deputy Inspector-General BARCLAY, M.D.

1. In accordance with the request contained in your letter No. 1815, of the 28th November, I have the honour to submit, for the consideration of the Major-General Commanding the Mysore Division, the following observations on the prevalence of enteric fever in the lines of the Royal Horse Artillery at Bangalore.

2. The details as to the origin of the disease in those lines, and the extent of its prevalence in them in former years, given in my letters to your address, No. 473, dated 22nd July, 1868, and No. 686, dated 13th September, 1869, need not be repeated.

3. The statistics given in the latter were up to the 6th September, 1869. Between that date and the end of the year, 6 more cases of enteric fever occurred in the Royal Horse Artillery, making 12 in all during 1869, the annual ratio per 1,000 of the strength represented by that number being 102.03.

In 1870 there were 7 admissions, or 49.74 per 1,000 of the strength. During the current year there have been no admissions up to the present time, either in the Royal Horse Artillery or in the detachment of the 76th Regiment, by which the barracks of the former corps were occupied from the end of March to the end of November.

4. Whether enteric fever be considered to be a disease of long standing in Bangalore, or one of recent introduction, there is no doubt that all the bazaars at the station are now more or less contaminated by its "contagium," and that the abominable custom which prevails in most of them, of storing up human excrement for sale, in heaps or pits (from which neither air, earth, nor water can escape pollution), must tend to its perpetuation and propagation. Natives living in those bazaars may become hardened to the poison, as has been observed elsewhere, and escape its effects; but no such immunity is to be expected for young soldiers frequenting the bazaars, more particularly if, in addition to breathing the impure atmosphere, they also drink the polluted water of the wells, as they doubtless often do; and, in fact, cases so contracted do occur from time to time in all the corps at the station. In the Infantry, although the cases have been less numerous, the disease has been far more fatal than in the Artillery.

5. That the occurrence of cases so originating can ever be altogether prevented is improbable, and all that can at present be done to reduce their number (in addition, of course, to the employment of every effort for the improvement of the sanitary condition of the bazaars) is to provide the men with means of amusement, and employment of an agreeable description elsewhere, and to discourage or disallow their visits to the bazaars as far as possible.

6. But the much greater prevalence of the disease in the Royal Horse Artillery than in any of the other corps at the station, during several years, proves that (in addition to the risk incurred by the men of that arm, in common with those of all others, from their visits to the bazaars) they must have been exposed to some special risk from which the others have been exempt.

7. In the last of the letters above quoted, and in all my annual professional reports addressed to the Director-General of the Army Medical Department, I have recorded my opinion that the source of that risk is the infected ravine between the barracks of the Cavalry and those of the Royal Horse Artillery, in

which the disease prevailed to so great an extent and in so fatal a form in 1865, and that its exciting cause is, for the most part, the use of impure water from one or other of the wells in that ravine, or from the old Horse Artillery wells at its lower extremity, in all of which the supply has been ascertained by analysis to be extremely impure. As the back yard of almost every house in the pensioners' village, and the horse-keepers' parcherry in that ravine, is used as a latrine, the soil being deposited on the surface, and rarely if ever removed, except by the periodical washing received during the monsoon, and as the maze of ruts and nullahs on the outer slope of the ravine is habitually defiled by the excreta of a large number of natives who resort to it from either side, the source and the nature of the contamination of the water in those wells are obvious enough.

It is also easy to understand how that contamination reaches its maximum, not at the commencement of the monsoon, but six weeks or two months later (at which time enteric fever is most prevalent), as it must take some time for the filth to reach the wells by percolation, their distances from the villages varying from 50 or 60 to 600 or 700 yards.

8. That the "contagium" is not to any extent air-borne I am unable to say, the ravine and villages being directly to windward of the barracks whenever the wind is to the southward of south-west, as it often is during the monsoon; but I do not think much evil can be produced in that way, as the greatest prevalence of the disease, as has been stated, is not at the commencement of the monsoon, when the surface must be most foul, but towards its termination.

9. You are aware that the late Sanitary Commissioner, who was deputed by the Madras Government to investigate all the circumstances connected with the prevalence of enteric fever in the barracks of the Royal Horse Artillery at this station, took quite a different view of the causation of the disease, and attributed it to exhalations from the Ulsoor Bazaar, extending to the north block of the barracks during calms, supposed to be of frequent occurrence at night during the south-west monsoon. The impurity of the water supply he believed to be without any effect in the production of the disease. In arriving at this conclusion, he appeared to be mainly influenced by information which he had received, that nearly all the cases of the disease admitted into hospital had originated in the north block of the barracks, only two out of twenty-three cases having been admitted from the south block. This information, however, you are aware was erroneous. To test it, I procured from the Surgeon-Major in charge of the Horse Brigade, a nominal list of all the men admitted with enteric fever in 1869, and requested you to do me the favour of forwarding it to the Officer Commanding the Royal Horse Artillery, and ascertaining from him the particular block, and the part of it (centre, north, or south end), in which each of the men named had slept during the fortnight preceding his admission to hospital.

The result was that, instead of a great preponderance of cases in the north block, exactly two-thirds of them were found to have originated in the south one. This disposed of the chief, and, so far as I am aware, the only argument in favour of the late Sanitary Commissioner's hypothesis; but I did not attach much importance to the preponderance of cases in the south block, as proving the source of the danger to be on that side, for, if my views are correct, that preponderance must have been to a great extent accidental, and I was not surprised to find, at the end of 1870, that of the seven cases which had been admitted during that year, four had originated in the north block.

10. It is impossible to exaggerate the abominations of Gowlee Street in the Ulsoor Bazaar, and it is obvious that the existence of a filthy bazaar so close to the barracks must be injurious to their sanitary condition. I have no doubt, also, that the specific poison which produces enteric fever exists in that bazaar, as it does in all the others at the station; but I think it is clear that the undue prevalence of that disease in the Horse Artillery Barracks is not due to exhalations from it finding their way to the rooms, and there exercising a poisonous influence on the men, from the facts that at the season of chief prevalence of the disease, the bazaar is directly to leeward of the barracks, and that enteric fever is almost unknown in them during the north-east monsoon, when the bazaar is directly to windward of them.

11. The disease having, on a former occasion, ceased at once when the Horse Artillery wells were temporarily abandoned, and the supply of drinking water procured from the Dhobees wells; and an order having been issued about the end of 1869, that this change should be permanently introduced, I ventured to predict, with considerable confidence, in my annual report for that year, that a marked improvement would be observed, in consequence, during the following one. The result, however, though encouraging, was not quite so favourable as I anticipated, seven cases of enteric fever having been admitted in 1870, but the occurrence of these cases was in all probability due to the imperfect manner in which the orders as to the source from which the drinking water was to be procured were carried out. Although it was supposed to be invariably taken from the Dhobees wells, it was not so by any means. I frequently saw the puckallies filling their bags at the wells in the infected ravine; and if I am right in believing the chief source of danger to be there, the occurrence of a few cases was to be expected from such disobedience. From the commencement of the present year the puckallies have been much more strictly looked after, and the water-supply has been procured almost entirely, if not entirely, from the Dhobees wells. On one occasion, not long ago, I found a puckally of C Battery 23rd Brigade Royal Artillery, filling his bags at the forbidden place, and that is the battery in which the solitary case recorded in the whole Artillery force during the year occurred.

In the Horse Artillery Barracks there has not been a single case, although these barracks were occupied during the season when the disease is usually most prevalent, by a strong detachment of the 76th Regiment, consisting chiefly of very young men, much more likely to suffer from it than the older soldiers of the Royal Horse Artillery would have been. The experience of one year is of course insufficient to prove conclusively the effect of the change in the source of water-supply, but it would be difficult to devise a more crucial test of the efficacy of that change than the location in the barracks of a body of very young men just arrived from Europe; and the expediency of continuing to use every precaution to ensure the water-supply being taken invariably from the same source is surely established by it.

12. Of the continued existence of the "contagium" of enteric fever in the ravine between the Cavalry barracks and those of the Royal Horse Artillery, the death of the late Quartermaster Butcher, and the dangerous illness of nearly all his family, afford but too sure proof. His house was in the lower part of the ravine, separated from the pensioners' village only by a road, and fully exposed to any exhalations that there may be from that insanitary locality. From what source his water-supply was procured I do not know, and it would probably be impossible to procure any reliable information on the subject.

13. The measure that I consider to be of chief importance for the prevention of enteric fever in the Horse Artillery barracks is the completion of the works which have been so long in progress for forcing up the water of the Dhobees wells, and its being laid on in or close to each room. It would of course be a great advantage if a sufficient supply for all purposes could be obtained from those wells, as suggested by the Sanitary Commissioner; but it appears to me that the experiment of increasing five or six fold the quantity daily drawn from them must be attended with some risk to the purity of the supply, even if their number be doubled, as it is by no means certain that the much more rapid passage of the water through the natural filtering-bed, which must be involved by doing so, would be equally efficacious in freeing it from impurities. After the last pumping experiment the water in the wells was muddy, and quite unfit for use for many days.

14. But even if the water from the Dhobees wells were laid on at the barracks, the existence of the two native villages in the ravine between them and the race-course plateau, would still be a continual source of danger. The surface can never be kept clean while they remain there; the water in the wells must always be polluted by them as it is at present; and, even with constant watching, it would be almost impossible to prevent some of that water from being used by the troops on either side. Farther, should cholera ever get a footing among the native population, it may be assumed, from the severity of the epidemic of fever in 1865 (on account of which the portion of the horsekeepers' village on the outer slope of the ravine was abandoned and thrown down), that it would

prevail with great malignancy, and establish a focus of extreme danger to the large number of European troops on either side. I am therefore of opinion that the removal of these villages is, on sanitary grounds, extremely desirable: and, if it can be carried out, I would again suggest that the ground should be levelled, drained, turfed, and planted with a few trees by the sides of such roads as it may be considered desirable to make through it. With little trouble a sufficiency of hay might be grown on it to repay many times over the expense of keeping it in order.

15. Whether the villages be removed or not, I think it will be, on sanitary grounds, unadvisable to bring back the horse lines to their old site. When that site was abandoned, on account of the saturation of the ground with the fluid excreta of the horses, I recommended that green crops should be raised on it during two successive seasons, before it was planted with hurriali grass. That has now been done, and it is impossible to say that the purification of this site, directly to windward of the barracks, and within a short distance of them, has had nothing to do with the improvement that has taken place in the health of the troops occupying them. The drainage of the new horse lines is certainly much better than that of the old ones, and I should think it would be an advantage to the animals to remain where they are.

16. I have repeatedly urged the expediency of adapting all the latrines at the station for the dry earth system of conservancy, and introducing that system in an efficient manner. The latrines attached to the Horse Artillery barracks are very inferior, and it is desirable that they should be removed altogether, and replaced by others adapted for the dry earth system. With a view to the prevention of the spread of enteric fever, and other fœcal diseases, I am of opinion that that change is urgently required.

17. Latrines on the dry earth system, for followers both public and private, should also be provided, and steps taken to ensure their being resorted to, and kept in a cleanly state.

18. I have examined the quadrangle to which you refer, bounded by the sick lines and family quarters of the Royal Horse Artillery, the Madras road, Cambridge road, and the lane behind the house of the late Captain Anderson, and inquired into the sanitary history of each of the houses in it. Cases of enteric fever, I find, have occurred in all of them, and the locality is evidently a very unhealthy one. All the wells that I saw are dry, and apparently used as receptacles for rubbish (the nature of which I could not discover), and I could not ascertain the source of the water-supply in any of them, except that occupied by Mrs. Butler and her family (all ill of fever), in which it was stated to be procured from the Dhobees wells. It would no doubt be a great sanitary advantage to the family quarters of the Royal Horse Artillery if all these houses could be removed, and the quadrangle either laid out in grass or gardens, or utilized as a site for a riding-school, for which, I believe, it affords ample space.

19. The municipal authorities have recently sanctioned the establishment of a livery stable in the quadrangle, within a few yards of the end of the family quarters of the Royal Horse Artillery. This, in so unhealthy a locality, is, I think, to be regretted, partly because the impurity of the atmosphere must be to some extent increased by the excreta of the animals, but much more because of the number of natives of the lowest class (coachmen, ayces, grasscutters, and their families and relatives), whom it will introduce into the immediate vicinity of the quarters.

20. With reference to the drainage of the "tail of the Dummiloor tank," I have little to add to the remarks in my former letters already referred to. The swampy ground on the side of the tank next the barracks appears to be increasing in extent, and I consider the necessity for the proposed drainage to be very obvious and urgent. The officers' lines are much more exposed than those of the men to malaria from that source, and in them severe neuralgia is frequently produced by it. Attacks of intermittent fever, also, are occasionally traceable to the same source. Draining the swamp, however, cannot have any effect on the prevalence of enteric fever, beyond what may result from an improved condition of general health among those now exposed to its exhalations, giving greater power of resistance to the specific poison or "contagium" of that disease.

APPENDIX No. IV.

REMARKS ON THE OUTBREAK OF CHOLERA AT
SECUNDERABAD.

By Assistant-Surgeon Scott, M.D., 18th Hussars.

My attention having been drawn to certain paragraphs in Dr. Cornish's Appendix (dated 26th September, 1871, No. 1357) to his Report lately submitted on the outbreak of cholera at Secunderabad, in Her Majesty's 18th Hussars, wherein statements occur which if left unexplained might tend to mislead, I would beg to make a few remarks on the subject.

In paragraph 4 of his Report, the Sanitary Commissioner states "it is to be very much regretted that the evidence as to the actual source of water used by the regiment for some time before the outbreak should be so unsatisfactory." I am quite at a loss to know how this conclusion was arrived at, the evidence that the regiment obtained its water from a particular well in the Sapper lines for fourteen months previously to, as well as on the day of the outbreak, is perfectly satisfactory; the water of this well was considered the best in Secunderabad, and used up to the 25th of May by the Sappers and their families, who lived close by. On the return of the regiment from camp (23rd June), it reverted to the old Begumpett well for its drinking water, it not having been thought judicious to allow the men to make use of the water from the well in the Sapper lines which had not been drawn for at least a month. This fact was evidently not known to Dr. Cornish, for in paragraph 5 of the same report he again says "all the time I was at Secunderabad, and though visiting the locality frequently, I never saw more than occasional persons drawing water from the well in question." At the time of his visit the 18th Hussars were actually getting their water supply from a different source altogether, the well before alluded to at Begumpett.

With regard to the cause of the outbreak, I think it must be admitted that as yet no light has been thrown upon the subject. The theories advanced have been many; in this particular instance, however, I am unable to take the view of the water contamination to which Dr. Cornish seems to incline.

The theory of the propagation of cholera by means of water I am not prepared to reject; it is one in my opinion as equally entitled to consideration as many of the others brought forward, but the evidence which would point to the fouling of the water by choleraic discharges, in the case of the outbreak in the 18th Hussars, appears to be so far from satisfactory, that little value I think can be attached to it. It was ascertained beyond doubt that the few cases of cholera which did occur among the natives, a few days before the outbreak in the 18th Hussars, were at a considerable distance, and out of the way altogether of the wells on the parade ground, and they did not obtain their water from any of them.

Had cholera existed in the neighbourhood of this well previously to and at the time of the outbreak, its contamination would have been feasible, but the very fact of the contrary having been shown is sufficient to warrant us in being sceptical in receiving this theory as applicable to the outbreak in the 18th Hussars.

It is true that when the water of the well was examined by the analyst of potable water, two months afterwards, it was found of doubtful quality, but this does not at all prove it was in that state when used by the regiment, for it is well known that every large well exposed to the air soon becomes foul, if not in constant use.

May I request you will have the goodness to forward this letter for the information of the Inspector-General, B. M. Service, Madras, as well as the attached statement on the subject from Major Mesham, who was Acting-Assistant Quartermaster-General at Secunderabad during the late outbreak of cholera in the 18th Hussars.

Statement by Major Mesham, Officiating Assistant Quartermaster-General, respecting the Water Supply at Secunderabad.

It appears to me that the Sanitary Commissioner has by no means established his theory of the drinking water being the cause of the outbreak of cholera among the 18th Hussars in Secunderabad in May last year. I ascertained that the three travellers from the direction of Masulipatam, who died from the disease a few days before it attacked the 18th Hussars, did not procure their drinking water from the wells on the parade grounds, but from the Hoopain-Saugor tank. No cholera was imported into the place from the north. It came from the south-east. If travellers suffering from cholera did contaminate the water supply of the regiment in the manner suggested by the Sanitary Commissioner, there was no record of them, and a very strict espionage was exercised by the police over all travellers entering and leaving the place. Up to the time the 18th Hussars were attacked, no cases occurred in the station excepting one case in Chota Mulkapoor, one in the 24th Native Infantry lines, and three in a chutter at the end of James Bazaar, none of which drew their water supply from the parade ground wells. In the village of Balmural, close to the well from which the water supply of the 18th Hussars was drawn, but one case of cholera occurred (if my memory serves me right), in an old woman, and this was after the regiment had removed into camp. The three companies of Sappers lost only one child from the disease, and this occurred after the regiment had camped out.

• W. E. K. MESHAM, Major.

Bangalore,
14th March, 1872.

APPENDIX No. V.

THE FOLLOWING OBSERVATIONS ON THE EFFECT OF HILL CLIMATES ARE EXTRACTED FROM A PAPER BY ASSISTANT-SURGEON CORBAN, M.D., 21ST HUSSARS, ON "INDIAN HILL CLIMATES, THEIR USES AND ABUSES."

"THE opinions recorded by many Indian writers, as to the advisability of generally utilizing hills in India, are so numerous and diverse, that a few remarks on the subject may not be out of place.

"During the year 1871 there were 720 invalids at Kussowlie. Some of these men were never in hospital while at the dépôt, but did their duty the whole time; 202 were recruits just arrived, the remainder had been in the plains for periods varying from 5 to 20 years. It must not be supposed that all these men derived benefit alike from their run on the hills; and it is with the object of explaining this point that I have given the above figures. Many of the men, in fact, never improved at all, but were just as sickly looking the day I went down the hill with them as on the day I brought them up; and this after being on the hills all the season (*six months*), and having the advantage of a splendid climate, far better food than in the plains, and comfortable barracks. On referring to the hospital records, I found that all these men were *old soldiers* who had been all their service in the plains, many of them having volunteered from regiments going home. It is a common practice in India, at the period of invaliding to the hills, to send men who have been long on the plains to the convalescent dépôt, merely as a change, or because they look rather washed out. From what I have seen, I believe that the effects of this short run to the hills, on these men, is anything but advantageous; for it is certain that after a long sojourn on the plains a man's system gets into a peculiar state—torpid organs and altered secretions. Now place this man suddenly at an elevation of 6,000 feet, and leave him there for six months only, and I consider it impossible for his bodily health and functions to be regenerated, so to speak, in such a short time. To effect any beneficial change in his health, he ought at least to pass two successive seasons on the hills, and then he will derive marked benefit, and return to his regiment a strong renovated soldier.

"As a proof of this assertion, I bring forward the cases of men who manage to remain at the various dépôts for several successive seasons, holding appointments as gardeners, orderlies, clerks, butchers, and the like. They are as different as possible, in appearance, from those who have only had a 'six months' run on the hills. In fact, the former look in perfect health, strong and robust, as if they had just come out from England. This is an important fact, and goes to show that the longer a man has been in the plains, so much the greater time he should remain in the hills, to produce that beneficial change required in his system, and to undo the mischief a long service in the plains has brought about. If it is considered impracticable to leave him in the hills 'certainly not less than two full seasons,' then let him be sent to England. Any way do not send him to the hills for six months, to suffer from the sudden change of climate, without giving him time to benefit thereby, and to the exclusion of some recruit, who most undoubtedly gains by spending his first six months in India on the hills.

"In the case of old soldiers, the above mistake is natural, so long as it

supposed that hill climates 'ought to act like a charm on them, and that a residence of a few months there can undo all the mischief of a previous long plain service, and in fact make new men of them. *What would be the good to a malaria-stricken, dried-up old man, of a run to England for six months only, after a long Indian service?* In short, either give an old soldier time to recover at the hills, or do not send him there at all, but let him be sent to England.

"Financial reasons may perhaps be adduced against the latter course, still it is, I think (having no figures showing cost of overland transport), extremely probable that leaving a man an extra few months in the hills to recover would be by far the most economical plan. After having read all that has been written about hill climates in India, I cannot help thinking that we are still far from having a due appreciation of their value, and that too more as regards men enfeebled by plain service, fevers, anæmia, and general debility. After a continued service on the plains, I maintain that the climate of the hills is far more advantageous to the great majority of invalids than sending them to England in January, or in the beginning of a severe spring; but it is indispensable that they should remain at least eight or eighteen months on the hills to recover perfectly. Even let invalids land at home, any time during the year, and I doubt whether they will have a climate so suited to their altered constitutions as they can have near at hand in the Indian hills. Again, an old soldier, on going home, loses all his comforts, has no native servants to do anything for him, but has to do everything for himself, and this is by no means an unimportant matter to a weakly soldier from India.* When the annual order arrives at a regiment to send so many men to such or such a hill dépôt, it may perhaps be questioned whether a more judicious selection of invalids might not be made. As long as a man (who must be invalidated to England the next cold season) can go through the hot weather, it is much better to keep him with his regiment, where he would be more comfortable. He cannot improve to any extent by a short run in the hills. For the first couple of months his constitution struggles (a miserable process to him) to adapt itself to the sudden change of climate, ending certainly in his name swelling the mortality or invaliding returns from convalescent dépôts. Either way the result is hazardous to him, and it greatly depreciates the curative value of hill climates.

"It is remarkable that there is a great want of occupation for soldiers at convalescent dépôts. They have a fine climate, excellent food, and good quarters; but exercise—a most important condition of health—they have little or none, except a short walk of half a mile or so once a week, and this too in a climate where actual hard work is not fatiguing. Let them be suitably employed in road-making—making encamping grounds, &c. Let them have a room where they can sit down and drink their beer. Anyway, get the men out of their barracks (they never think of going out themselves scarcely), and let them have healthful employment, which will tend greatly towards their physical improvement, and give them something to look forward to beyond anxiously listening for the canteen bugle summoning them to come and be watered like cattle.†

"Are hill climates curative, or merely preservative of health?

"The usual and generally accepted answer is, that they are chiefly preservative. Now, judging from what I have seen, and will briefly describe, I consider them both curative and preservative, and the former in a degree not sufficiently appreciated. However, in the remarkable words of Scott, 'It is ill arguing against the use of a thing from its abuse'—as is too often done in the case of Indian hill stations.

"When I was stationed at Deesa, in the Bombay Presidency, Mount Aboo Sanitarium, forty-five miles off, was largely utilized as the most important agent in bringing round any man who was slowly recovering at Deesa. Up to

* An old Indian soldier likes mild warmth, and the Indian hills afford more of that than most home stations, Netley, Shorncliffe, Colchester, &c.

† Hitherto, at Kussowlie, there was no room or place where the men could sit down and drink their beer comfortably; each section goes to the canteen at a bugle call, then and there swallowing their liquor, and at once go away to make room for the next; this, I hear, will probably soon be altered.

the beginning of the rains every year, relays of bullocks were placed every eight miles on the road to Aboo. When, therefore, the heat of the day somewhat abated—at about 6 P.M.—the spring-cart, holding two invalids, started from the hospital. They generally slept the greater part of the journey, and found themselves at the foot of the hills at 9 A.M. next morning, getting up the hill by about 11 A.M. These men remained at Aboo till the beginning of November, or until the climate had the desired effect; and, with very few exceptions, they all came back strong and robust, with a good healthy look in their faces. Had these sickly men been kept at Deesa, the result would have been fatal, as is well known to anybody who has served there. (It is, perhaps, the hottest station for Europeans in India.) The cases sent to Aboo, and which were cured thereby, were, in order of frequency, low fevers, anæmia, general debility, some lung affections, secondary syphilis, eye diseases,—men especially who were regularly knocked down by constant attacks of fever, pale and washed out, from the terrible heat. I have constantly seen the thermometer stand at 103° at 3 P.M., in the hospital, which was well-built, and had the usual cooling appliances. This plan of sending convalescents and three companies of the regiment at Deesa every year to Aboo was first ordered by the present Commander-in-Chief in India, then commanding the Bombay Army. I believe that to both these circumstances may be attributed the great healthiness at Deesa. The average yearly mortality for five years while I was there was a little over 12 per 1000. Both officers and men who were sent sick to Aboo were, with very few exceptions, completely restored; and as I was at Deesa about five years, my opportunities of knowing the effects of the Aboo climate were most ample. I may mention that the men were very indifferently fed at Aboo. Being a sacred Hindoo hill, no beef could be had there; the men consequently got nothing but pork and scraggy mutton. Notwithstanding this, the climate there worked wonders. I feel certain that the restorative effects of the Himalayan climates are much greater than that of Aboo, as the stations have a greater altitude, and meat and other rations are so much better at the former. But all hill climates require time to act: *the longer a man has been in the plains, by so much the greater time he should remain at a convalescent hill depot.* Again, if hill stations are not curative, how is it we have so many sick officers sent to the hills every year by Medical Boards for the recovery of their health?*

"It has been argued by some that although the climate of Indian hill stations is very genial, and a great improvement on that of the plains, still that it is not the European's climate. Now, at an elevation of 6,500 feet in India we get a climate 10° hotter than the English climate. This to an old Indian soldier is far more agreeable and restorative than the climate of most English stations. Taking Kussowlie and Mount Aboo as examples, we have at these stations three very disagreeable wet months from about 15th June to 15th December; for the remaining nine months there is no English climate, available for soldiers, so genial and beneficial for invalids—excepting Torquay, Ventnor, and a few other mild spots out of the reach of soldier invalids. All the advantages are on the side of the Indian hills, as they have nine fine against three wet months, whereas it is *vice versa* at home. The fine weather there scarcely ever exceeds three months, against nine cold, wet, and stormy months. Again, although appreciating as much as any one the advantage to a sick person of a run at home, I cannot look upon it as the great panacea, in the case of soldiers, for all Indian ailments—as some profess to believe who forget that they have a far finer climate in the hills close at hand, where most of the diseases of the plains can be cured; thus avoiding the discomforts to invalids of a long journey to Bombay, a rough sea voyage, and an English January or spring, and saving to the State the expense of the invalid's passage home, and the cost of bringing another man out to replace him. I have no reliable figures at hand regarding the expenses of the overland transit for troops, but I have heard it is very costly, and that it is yearly becoming more so. Now, let the suggestion of Drs. Muir, Beatson, and Munro be acted on, as to locating a great number of soldiers in the hills, giving them healthful employment while there, and let

* We only lost one man of all the bad cases sent to Kussowlie, the others recovered rapidly, and owe their recovery to the hills.

the annual invalids have a longer time on the hills, and I believe that our Indian Army would not be annually reduced by 2,634 invalids sent to England; being at the rate of 47·05 per 1,000 mean strength (*vide* Blue-Book 1869), besides 1,582, the average yearly deaths in India.

"The best authorities state that an elevation of about 6,000 feet is beneficial in most Indian diseases, improving sanguification, digestion, muscular and nervous vigour. Why, then, should Indian hill climate be depreciated, because perhaps invalids who must surely be sent to England are every year sent off to the hills to escape the hot weather, or because sick men who cannot recover in any climate die at convalescent dépôts?

"EFFECTS OF HILL CLIMATES ON YOUNG SOLDIERS.

"I will now briefly describe the effects of hill climates on young soldiers just out from England. The recent recruits are too well known to require a description here. At Kussowlie in 1871 we had 202 of them belonging to various regiments, and I do not think it would be possible to find a more wretched lot of emaciated starvelings anywhere. I feel convinced that few of them knew what a good meal was till they enlisted. Their average age was about eighteen, and they belonged chiefly to the 72nd and 65th Regiments just out from England, with a few of the 1st Battalion of the 14th and the 1st Battalion of the 11th Regiments: the Cavalry and Artillery furnished none. These poor lads were weakly, thin, and wretched-looking. On arrival at Kussowlie, though not actually sick, few of them were able to march with their rifles up the hill—nine miles on a good road—but fell out, and had to be carried. There was a most wonderful improvement in them after their six months on the hill. They became strong, robust, and healthy-looking in appearance; in fact, than these boys no better example could be found of the beneficial effect of a fine climate, with excellent food, on the young recruit. Had these lads been kept on the plains, many of them would have been lost or would have required invaliding. At Kussowlie, of the 202 recruits only one lad died of typhoid, the germs of which he had perhaps brought from home with him; and the admissions were, with few exceptions, for trivial ailments—slight diarrhœa, and the like. Looking at the result in this case, it was most encouraging. These young soldiers of the 65th and 72nd were sent down to join their regiments on the 16th October, preparatory to marching to the camp of exercise near Gazerabad. Rest, plenty of good food, and a fine climate was what they wanted; and, enjoying these three advantages at Kussowlie, the benefit derived from them was great and perceptible to all. In conclusion, the points I should wish to see more widely understood and acted on are—

"1. That Indian hill climates are eminently curative in nearly all Indian diseases, as they are by far more genial and equable than any English military station.

"2. That invalids who die at an Indian sanitarium are generally men who could not recover in any climate.

"3. That it is not desirable to prohibit the practice of sending to the hills men who require change to England, as another hot season in the plains may be too much for them.

"4. That hill climates must have time to act. The longer a soldier has been in the plains, the greater time he should remain on the hills. We never think of sending a broken-down man to England for six months only; and putting the reviving influence of "going home" out of the question, I believe that a well-selected hill climate will bring round the enfeebled soldier as soon, if not sooner, than any to be found in the United Kingdom.

"Finally, in the Himalayas, Aravallis, and Neilgherries, we have climates that would be highly prized if they existed in or near England; why, then, should so many lives be yearly wasted in India by delaying to avail ourselves of them? There is no scarcity of sites. On the north and north-east of Kussowlie there are fine open mountain ridges, with plenty of good water; and the same are to be met with all over the Himalayas. At Aboo, the plateau of Oorea is capable of holding a large force. Its advantages and climate were seen and appreciated, when I was at Aboo in 1866, by His Excellency the Com-

mander-in-Chief of India, then Commander-in-Chief of the Bombay Army. I confidently hope to see the day when the full utilization of these fine climates will be the means of lessening the unpleasant anticipation of an Indian service, with its terrible *ennui* and train of insubordination and crime. Open up the mountain ranges, employ the men there in road-making, levelling, hutting, and in learning to be useful to themselves ; and so surely as we do, we shall see the great benefit derived by the soldiers, reduce to a minimum the yearly losses by death and invaliding, improve the army by making it more hardy, active, and self-reliant ; and thus the outlay in building new stations, &c., will soon be well repaid in the economy, efficiency, and welfare of the Army in India."

APPENDIX VI.

LANDOUR CONVALESCENT DEPOT.

Abstract of the Annual Report, and of Analytica Charts, on Ague, Syphilis, Phthisis, and Hepatitis that accompanied it, for the year 1869.

By Staff-Surgeon KELLET.

The convalescent station of Landour is situated on a nearly isolated hill of one of the lower Himalayan ranges, in latitude $30^{\circ} 27'$ N., longitude $78^{\circ} 10'$ E. Its elevation is 7,500 feet.

The cantonment is 5,000 feet above, and three miles in a direct line from, the plain of the Deyrah Dhoon.

The rock formation consists of clayslate and limestone. A deep, rich clay soil covers the rocks, and gives growth to oak, pine, rhododendron, and other trees, besides various shrubs.

Landour is surrounded on three sides by vast ranges of mountains, that rise, wave over wave, as far as the eye reaches; and, increasing in altitude as they recede northwards, end in the great Gangootry and Jummootry ranges.

The Deyrah Doon, from 2,000 to 2,500 feet above the sea level, is sheltered from the hot winds by the Semalik range, and is cooled at night by the breezes from the mountains. Snow has fallen at Rajpore, and even at Deyrah. The climate—hot and variable as it is—might prove useful for colonization if divested of malaria. The Dhoon, reclaimed and cultivated, could supply the edible requirements of an immense population; the Ganges Canal, and the great rivers on its flanks, offer the cheapest and best water carriage for its produce, through the most important and densely inhabited districts. On the mountains behind sheep pasturage is found to a great extent, and here European colonists could form stations, in a magnificent climate, where they might be as healthy and as long-lived as in England.

The temperature of Landour is specially suited to Europeans, closely resembling that of the southern counties of England. I append a Table in which its climate is contrasted with that of Greenwich.

MEAN Monthly results of Meteorological Observations at the Royal Observatory, Greenwich, in the years 1840-1861 (Glaisher) compared with those at Landour in the years 1864-1869.

TEMPERATURE OF THE AIR.

Months.	Highest in years at		Lowest in years at		Range in month at		Mean of all highest at		Mean of all lowest at		Mean daily range at		Mean temperature at	
	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.
January ..	57°	61° 33'	4°	28° 33'	53°	33°	43° 2'	46° 33'	33° 7'	35°	9° 5'	11° 5'	38° 3'	38° 5'
February ..	62° 3'	59° 33'	7° 7'	29° 66'	54° 6'	29° 67'	44° 7'	47° 33'	33° 2'	40° 66'	11° 5'	11° 33'	38° 4'	38° 66'
March ...	71° 5'	74° 33'	13° 1'	36°	58° 4'	38° 33'	50°	56° 33'	35° 3'	41° 5'	14° 7'	14° 5'	41° 7'	46° 16'
April ...	79°	80° 16'	25° 3'	40° 83'	53° 7'	39° 33'	56° 8'	68°	38° 6'	51° 66'	18° 2'	16° 16'	46° 3'	56° 66'
May ...	86° 2'	86° 33'	28° 3'	50°	57° 9'	36° 33'	64° 4'	74° 33'	44° 2'	59° 66'	20° 2'	14° 50'	52° 8'	63°
June ...	94° 5'	87° 66'	36° 2'	57° 66'	58° 3'	30°	71° 2'	77° 16'	50° 2'	65° 5'	21°	11° 5'	59° 2'	67° 33'
July ...	93° 3'	82°	38° 9'	58° 16'	54° 4'	23° 84'	73° 8'	73° 83'	53° 2'	62°	20° 6'	9°	61° 9'	63° 16'
August ...	92°	79° 33'	40°	56° 43'	52°	22° 90'	72° 8'	70° 16'	53° 4'	61° 16'	19° 4'	88° 3'	61° 3'	61° 90'
September	86° 4'	78° 33'	32°	56° 16'	54° 4'	22° 17'	67° 4'	69° 33'	48° 9'	58° 5'	18° 5'	10° 66'	56° 9'	60° 33'
October ...	81°	75°	26° 5'	45° 5'	54° 5'	29° 5'	58° 3'	65° 16'	43° 7'	55°	14° 6'	12° 66'	50° 2'	54° 16'
November	66° 3'	65° 33'	19° 4'	36° 5'	46° 9'	29° 33'	49° 3'	56° 16'	37° 7'	41° 33'	11° 6'	14° 33'	43° 4'	45° 33'
December.	62° 8'	58° 33'	8°	31° 51'	54° 8'	26° 82'	45°	55°	35° 5'	37°	9° 5'	12° 83'	40° 1'	40° 63'
Means...	77° 67'	73° 99'	23° 2'	43° 89'	54° 4'	30° 10'	58°	63° 30'	42° 3'	50° 70'	15° 7'	17° 93'	49° 2'	52° 97'

From the above comparison it will be seen that the "average highest-day temperature" is less at Landour than at Greenwich; much lower in June, July, August, September and October, and nearly equal in the winter months.

The "average lowest in the year" is many degrees above that of Greenwich, particularly in the winter months, when the temperature very seldom sinks below 28°, and then only for a day or so at a time.

The "Range in the months" is less than at Greenwich.

The "Mean of all highest" is above that of Greenwich; the difference in the warmth of the two places is in favour of Landour in January, February, March, October, November, and December.

The "Mean of the lowest" is higher at Landour in all months.

The "Daily range" is in favour of Landour.

The "Mean temperature" is a few degrees higher than at Greenwich. That the mean temperature of Landour is 78°, as stated at page 352 of Commissioner's report, is probably a misprint; for both calculation and observation agree in placing it somewhere close to 55°.

The following Table, showing a comparative view of the Hygrometrical conditions at Landour and Greenwich is valuable, inasmuch as great stress has been laid on the dampness and coldness of Indian mountain ranges:—

Months.	Mean tempera- ture of dewpoint at		HYGROMETRICAL DEDUCTIONS.								RAIN.			
			Vapour in cubic foot of air at		Short of satu- ration in cubic foot of air at		Humidi- ty satu- ration 100 at		Mean weight of a cubic foot of air at		Number of rainy days at		Amount col- lected at	
	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.	Greenwich.	Landour.
January...	35.4	27.2	Grns. 2.4	1.7	0.3	1.6	89	49	553	418	11.0	3.0	1.8	2.01
February...	34.4	32.2	2.3	2.1	0.4	1.1	85	65	554	416	10.0	3.83	1.6	2.10
March...	36.4	36.6	2.5	2.4	0.6	2.8	82	45	550	407	10.0	4.33	1.5	3.62
April...	39.9	41.1	2.9	2.9	0.8	3.9	79	42	542	407	10.0	4.16	1.8	1.87
May...	45.5	53.3	3.4	4.4	1.1	3.9	76	53	538	401	11.0	5.66	2.1	2.61
June...	50.8	57.7	4.2	5.1	1.5	3.7	74	58	531	402	10.0	9.93	1.9	6.24
July...	63.9	63.3	4.6	6.3	1.6	1.7	76	78	529	406	11.0	21.66	2.7	19.48
August...	54.1	64.4	4.7	6.6	1.5	0.9	77	88	528	404	11.0	25.0	2.4	33.26
September...	46.1	56.9	4.2	5.5	1.1	1.5	81	78	534	407	11.0	11.33	2.4	5.88
October...	46.1	46.1	3.6	3.4	0.6	1.8	87	65	539	408	13.0	2.5	2.8	0.41
November...	40.1	34.4	2.9	2.3	0.4	1.7	89	57	547	414	12.0	0.16	2.4	0.04
December...	36.9	29.2	2.6	1.8	0.4	1.5	89	54	552	415	11.0	1.5	1.9	0.84
Means and totals	43.7	44.4	3.3	1.7	0.8	2.2	82	61	541	409	136*	92.96*	25.3	78.44

* Number of rainy days in each year.

Table below shows height in feet (calculated for 30' latitude in India) in every month; when the mean, mean maximum, and mean minimum temperatures are the same as in England (Glaisher.) Landour is 7,500 feet high, in latitude 30° 27'.

Months.	Mean Temperature.	Mean Maximum Temperature.	Mean Minimum Temperature.
	Feet.	Feet.	Feet.
January	6,700	8,000	7,000
February	8,300	7,400	7,600
March	10,300	8,000	9,200
April	11,700	7,400	8,800
May.. ..	14,700	6,900	8,300
June.. ..	9,500	5,800	8,700
July.. ..	7,900	4,600	8,300
August	7,400	4,800	8,300
September	8,400	6,300	8,200
October	9,000	8,000	8,300
November	8,700	8,600	7,600
December	6,100	7,800	6,600
Mean	8,800 = 7,500 + 1,300	7,000 + 500 = 7,500	8,100 = 7,500 + 600

Landour has a sufficient altitude to give it an English mean temperature in February, July, August, and September. It would require to be 2,000 feet higher in March, April, May, June, and October.

On the whole it is warmer by the value of decrease of elevation, amounting to 1,300 feet; and this corresponds pretty closely with the observed mean temperature.

The height for "mean maximum" is too low, but runs pretty even, except in July and August.

The 3rd column would point to the "mean minimum" being at a lower level than at Landour in January and December, and slightly higher in February and November.

There is a general concurrence in all these observations, showing that Landour has a higher "mean temperature" of about 5° than Greenwich; that in winter it is many, and in the summer a few degrees warmer, particularly in April, May, and June.

To show the nature of the climate, this winter, I append a Table of daily Meteorological Observations.

1869.										1870.																					
November.										December.										January.						February.					
10 A.M.				3 P.M.			Clouds.			10 A.M.				3 P.M.		Clouds.			10 A.M.				3 P.M.		Clouds.						
Self-regis- tering Ther- mometers.			Maxi- mum in sun's rays.	Standard.	Maxi- mum.	Mini- mum.	Self-regis- tering Ther- mometers.	Maxi- mum in sun's rays.	Standard.	Clouds.	Maxi- mum.	Mini- mum.	Self-regis- tering Ther- mometers.	Maxi- mum in sun's rays.	Standard.	Clouds.	Maxi- mum.	Mini- mum.	Self-regis- tering Ther- mometers.	Maxi- mum in sun's rays.	Standard.	Clouds.									
Standard.	Maxi- mum.	Mini- mum.																													
1	64	56	47	124	55	{	58	50	150	59	{	Clear Bright	45	50	36	120	46	Clear	...	46	50	36	119	47	Bright.						
2	65	57	46	128	56	Do.	...	56	50	126	59	Do.	...	46	53	37	118	46	Do.	...	46	50	32	120	48	Do.					
3	66	58	48	130	56	Do.	...	54	55	126	56	Do.	...	40	50	35	112	47	Do.	...	50	50	36	122	56	Do.					
4	66	59	49	131	56	Do.	...	51	54	126	53	Do.	...	44	48	34	114	47	Do.	...	47	51	40	110	44	Rain.					
5	64	52	47	129	57	Do.	...	53	55	123	54	Do.	...	44	46	33	110	46	Do.	...	44	49	41	118	49	{					
6	58	55	46	128	57	Do.	...	54	55	123	56	Do.	...	44	45	32	110	46	Do.	...	46	54	40	119	49	Do.					
7	62	53	44	130	53	Do.	...	53	55	123	56	Do.	...	44	45	33	110	47	Do.	...	44	53	42	119	62	Do.					
8	63	51	45	121	55	{	52	53	127	54	Cloudy	Cloudy in morn	46	49	35	120	46	Do.	...	46	50	32	115	50	Do.	Do.					
9	62	54	45	122	54	Clear	...	51	53	125	56	Do.	...	45	50	36	120	47	Do.	...	43	50	36	114	39	Snow.					
10	61	53	43	131	53	Do.	...	50	47	94	53	Do.	...	45	50	40	120	47	Do.	...	35	43	30	113	44	{					
11	51	53	44	123	52	Do.	...	45	45	100	49	Do.	...	40	46	34	116	45	Do.	...	44	50	33	121	49	{					
12	62	61	41	119	54	Do.	...	41	43	110	44	Clear	...	38	43	33	112	48	Do.	...	37	46	33	111	44	Fog.					
13	53	52	45	125	55	Do.	...	41	49	112	46	Do.	...	41	50	34	120	49	Do.	...	45	42	32	119	42	{					
14	61	46	42	123	55	Do.	...	42	47	112	48	Do.	...	45	54	34	126	54	Do.	...	40	50	33	121	50	Do.					
15	50	52	47	125	53	Do.	...	42	49	118	44	Do.	...	48	52	43	120	54	Do.	...	42	54	36	120	50	Do.					
16	63	51	45	123	54	Do.	...	43	54	121	46	Do.	...	48	51	38	118	52	Do.	...	45	55	37	125	64	Do.					

1869.												1870.																																			
November.												December.												January.												February.											
Dates.	10 A.M.				3 P.M.				Clouds.	10 A.M.				3 P.M.				Clouds.	10 A.M.				3 P.M.				Clouds.	10 A.M.				3 P.M.															
	Standard.	Self-regis- tering Ther- mometers.			Standard.	Maximum in sun's rays.				Standard.	Self-regis- tering Ther- mometers.			Standard.	Maximum in sun's rays.				Standard.	Self-regis- tering Ther- mometers.			Standard.	Maximum in sun's rays.				Standard.	Self-regis- tering Ther- mometers.			Standard.	Maximum in sun's rays.														
		Maxi- mum.	Mini- mum.			Maxi- mum.	Mini- mum.				Maxi- mum.	Mini- mum.			Maxi- mum.	Mini- mum.				Maxi- mum.	Mini- mum.			Maxi- mum.	Mini- mum.				Maxi- mum.	Mini- mum.			Maxi- mum.	Mini- mum.		Maxi- mum.	Mini- mum.										
17	52	52	44	126	56	Clear ...	44	55	37	46	125	47	Clear ...	40	44	48	38	24	92	48	48	45	52	33	120	54	{ Clear. Bright.																				
18	51	51	41	123	55	Do. ...	47	54	40	47	122	41	Clear ...	40	44	48	38	34	56	42	Do. ...	44	49	36	118	53	Do.																				
19	46	52	39	134	50	Do. ...	46	53	38	47	122	47	Do. ...	41	47	48	40	35	110	48	Fog ...	46	53	36	120	54	Do.																				
20	48	48	39	124	51	Do. ...	48	42	34	78	49	Do. ...	43	43	34	88	44	34	88	44	Do. ...	47	55	40	124	54	Do.																				
21	48	49	40	115	50	Do. ...	34	39	29	110	39	Do. ...	40	44	30	108	44	30	108	44	Do. ...	49	55	43	124	55	Do.																				
22	46	47	39	112	50	Do. ...	35	43	30	110	39	Cloudy and rainy	38	38	29	105	38	29	105	38	Clear ...	48	54	39	124	53	Do.																				
23	44	46	38	114	49	Do. ...	39	43	32	110	40	Snow	38	46	29	110	42	29	110	42	Do. ...	48	54	39	120	54	Cloudy.																				
24	45	46	39	110	49	Do. ...	35	40	35	60	38	Cloudy	43	50	34	118	46	34	118	46	Do. ...	45	56	39	123	54	{ Clear Bright.																				
25	44	46	39	116	48	Do. ...	35	39	31	64	38	Do. ...	40	50	35	118	46	35	118	46	Do. ...	44	54	38	120	53	Do.																				
26	45	47	40	120	48	Do. ...	35	46	30	118	39	Do. ...	42	51	35	120	47	35	120	47	Do. ...	47	57	42	123	54	Do.																				
27	55	57	55	130	57	Do. ...	35	44	30	110	39	Do. ...	42	48	33	110	46	33	110	46	Do. ...	50	57	40	122	56	Do.																				
28	57	58	50	130	58	Do. ...	38	45	30	112	39	Clear ...	40	50	33	118	46	33	118	46	Do. ...	51	57	40	123	56	Do.																				
29	58	58	50	131	58	Do. ...	40	46	33	114	44	Do. ...	44	51	36	120	50	44	120	50	Do. ...	...	...	...	...	...	...														
30	56	56	49	126	56	Do. ...	40	46	33	118	44	Do. ...	45	51	37	120	47	45	120	47	Do. ...	...	...	...	...	...	...														
31	...	...	...	...	...	...	42	45	34	69	46	Do. ...	45	51	37	120	47	45	120	47	Do. ...	...	...	...	...	...	...														
Means	51.51	52.41	44.28	124.60	53.90	Clear ...	44.56	48.90	38.54	111.36	47.54	Clear ...	39.74	48.35	34.58	108.70	46.70	45.14	51.92	40.28	119.40	49.76	{ Clear. Bright.																								

There is not much wind, except occasionally in February and March, although there is a pretty regular, but almost imperceptible current from the snows southward, to meet the equatorial requirements. This air cannot be surpassed, for purity, except amongst the snowy peaks themselves. But, beyond what is demonstrable by meteorological instruments, the climate has been reported as "magnificent, perfect, &c., &c.," by all Medical Officers stationed at Landour for the last 40 years; and its vivifying effects on those long exposed to the degenerating influence of the plains have been fully dwelt on.

A cubic foot of air at Greenwich, weighing 541 grains, is composed—say of

	Grains.			
Nitrogen	416·57
Oxygen	124·43
				<hr/> 541·00

Therefore a man breathing 16·6 cubic feet per hour, inspires in that time 2,065·53 grains of oxygen.

The air of Landour is composed thus: weight per cubic foot, at an average pressure of 23 inches, 409 grains, say—

	Grains.			
Nitrogen	314·9
Oxygen	94·1
				<hr/> 409·0

giving at the above rates but 1,562 grains per hour; a difference equal to 24 per cent.

I had no data for the normal pulse and respiration of the invalids, so could not calculate accurately the effect of rarefaction.

On the arrival of the invalids both their pulse and breathing were accelerated, even to distress on slight exertion. This "short windedness"—as the men called it—disappeared in one or two months, while the vital capacity increased in a most marked manner. *Vide Charts.*

From observations I was able to make on hill-men I found the number of respirations to equal about 19. Hill climbing, that quickened very considerably the respirations and pulse in Englishmen, had not quite half the same effect on hill-men, many of whose hearts, however, beat irregularly.

In this part of the Himalayas, climate, taken in its widest sense, has produced a small, active, healthy, and brave race of hill-men, called Paharees. These are for the most part Hindoos, who, except the lowest castes, live on flour, rice, potatoes, succulent vegetables, fruit, &c., which are obtained with difficulty by diligent cultivation of the slopes and terraced sides of mountains, and of all level spots in the valleys.

They are wretchedly housed, are filthy in their persons, homes, and habits, and exist under the worst hygienic conditions, climate alone excepted. When the period for rice cultivation approaches they descend into the valleys, and there contract malarious fevers, the principal affections that assail them.

But with all the above defects in food, clothing, shelter, and general circumstances of life, there remain other climatic conditions that make the hill-men healthy and vigorous, and very far superior to his brother of the plains, although there is no original difference in race or colour. When the inhabitants of the plains become located in the hills, they in time acquire the vigour of hill-men. The Paharee, in the rice season, suffers from malaria perhaps as much as the residents of many parts of the plains; but when he ascends to his mountain home he shakes off the taint. A persevering, continuous struggle for the necessaries of life develops strength of body and mind, independence and self-reliance.

On the other hand the listless inhabitant of the everywhere hot and malarious plains, nevertheless, without energy or reliance, and often diseased, is scarcely conscious of cold, and is indisposed for active life or exertion, beyond what little is necessary to supply his wants.

Such are the contrasted results of climate, as exhibited in the natives of the hills, compared with those of the plains. It may be assumed that hill climates contain powerful health producing forces, when the natives continue healthy, long lived, and vigorous in defiance of every hygienic rule. I have never seen a case of scrofula, phthisis, scurvy, rickets, or other complaints among them indicating weak constitutions.

The deteriorating influence of the plains on body and mind are sufficiently obvious. The Paharee is the type of the race; the inhabitant of the plains, of its degeneration.

Such being the results of climate on the indigenous inhabitants, there is little difficulty in realising the rapid degeneration of Englishmen in the plains, which takes place in direct ratio to the heat and malaria to which they are exposed.

It would be comparatively easy to remove the troops from the hottest and most malarious stations to cooler and better, where perfect barracks would further defend them from excessive heat, and where the malaria might be less noxious; but this scheme carried to the utmost extent could only lessen the sickness and mortality to the degree now prevailing in the best stations, but which is still appalling,—even from cholera alone, from which the hills are practically free.

Landour and Mussourie have, on account of their splendid climate, been selected by government, and by various sects, for schools, convents, &c. Of the former institutions there are seven, containing, on an average for many years, over 300 pupils. The children have always thriven well, no diarrhoea nor other bowel complaints have prevailed, nor has any evidence of malaria shown itself; sore throats and skin affections are the principal complaints; in fact the health of the children is better than is usual in schools in England.

When the hot weather commences there is a general rush to the hills of all who can possibly get there, comprising individuals of every class, age, and sex.

Those who are sick arrive under recommendations from medical advisers, and restoration to health generally awaits them; indeed very few practical medical men in India deny that the hill climate benefits every kind of improvable disease. Such also appears to be the opinion of the European community generally, who, annually, in increasing numbers, flock to the hills with benefit, and leave without any suspicion that a deleterious influence is in operation there, an idea that might be easily induced by the numerous deaths occurring amongst persons who arrive labouring under hepatic abscess, and other equally severe and fatal affections.

Still there is a doubt as to the propriety of sending the sick of the army to hill stations. The benign climate that restores to health civilians, civil and military officers, ladies and their children should not act injuriously on soldiers, their wives and children labouring under the same affections.

If the greatest of hygienic conditions, viz., a good climate, be available for the army, only very powerful reasons should justify its not being utilised.

It seems a matter of duty, if possible, to remove men—diseased ones especially—to healthy hill stations, from the influence of malaria and intense heat, the immediate causes of fevers, diseases of spleen and liver, disorders of digestion, nutrition and nervous power.

Landour and Mussourie are much brighter and warmer than England itself; their air and water are purer, and they are free from all endemic disease. In their vicinity there is ground enough, known to be healthy, on which 10,000 men could be located, close to wood and water in abundance.

Huts to hold 15 men could be erected on Captain Pitz's plan for 300 rupees each. The convalescents at Landour could be hutted for many years for half what is paid for rent of bungalows each season.

If hill stations prove salutary for years to some regiments in good, and others in bad health, isolated instances of corps suffering from scorbutic dysentery or other similarly produced diseases aided by overcrowding, and other results of defective hygiene, the exciting cause should be examined with great caution before being attributed to climate.

Below, I have brought together a general mass of opinion of those who

deserve all possible consideration, on account of their known talents, but who I humbly think, have formed their opinions on insufficient data and limited experience of the hills, and I should not feel myself justified in disputing their opinions, if so much were not at stake.

Views have been adopted by the Commissioners appointed to inquire into the sanitary state of the Army in India in 1860, and promulgated as accepted facts, which might be re-investigated if any doubt as to their accuracy prevail, under the light that the increased experience of 10 years has thrown upon the subject.

It may be that the data have been taken by the Commissioners, by Deputy Inspector-General Dr. C. A. Gordon, C.B., and by Sir R. Martin from other hill stations than Landour and Mussourie, to which alone this report applies.

I do not think the same evidence would be given now that was offered to the Commissioners in 1860; different ideas exist at present as to the number of men who could hold stations in the plains in the hot months, to those which prevailed when the horrors of the mutiny were fresh on men's minds.

Railways have influenced the "great strategic positions." Most officers think that many stations might be done away with altogether, and that those we must retain might be held during the hot months by detachments, whose main body could lie in the hills. The advisability of keeping in the hills healthy men, especially young soldiers on first arrival from England, is universally admitted, but the utility of sending sick from the plains to the hills, is not always allowed.

The Royal Commissioners were doubtful on the subject. They report: "that hitherto it has been found that hill climates have been beneficial in certain cases of disease only, while in others, they are of doubtful efficacy, or positively injurious. Sickly regiments should not be sent to the hills, for such regiments invariably suffer in health."

(*Vide Commissioners' Report and the Evidence on which their recommendations on this subject are based.*)

Sir R. Martin stated "that hill stations are badly selected, are too elevated, and are in the focus of bowel disease. A great mistake is removal of troops in damaged health to cold, damp mountain ranges which are only applicable for preservation of health." He admits, however, "that children flourish like those in healthy English districts." In the first part of para. 17 of his "Recommendations" he partly explains the unjust disparagement of hill stations, but in the concluding sentence he falls in with the common error.

All the stations are not in "cold, damp mountainous ranges" (*see meteorological Tables of Landour given before*), and where children flourish, as they undoubtedly do at Landour, Mussorie, Sanawur, and other stations, it is difficult to believe that sick, if taken the same care of, should suffer. Dr. McLelland says "by ascending, fever and cerebral affections were avoided."

Dr. Maclean, C.B., Professor of Military Medicine, states: "There is a large class of diseases that cannot be sent to the hills. Bowel complaints and hepatic affections: these have to be sent to Europe."

Dr. McCorh states: "that the majority of diseases the troops suffer from are benefitted largely by the hills."

Dr. Jeffreys "recommends hill stations of different elevations, from 4,000 feet upwards, for different diseases."

Sir J. Lawrence states: "that there were constitutions that did not benefit by the hills, or but very little. That children thrive in the hills."

Colonel Greathead, C.B., states: "there was no doubt that the men in the hills looked better than those in the plains; they were more rosy." He, however, "attributed to the climate of Kussowlie the great mortality of the 32nd Regiment sent there from Peshawur suffering from fever and dysentery, and dying like rotten sheep." The question is, where did the sheep get the rot?

Dr. Grant says: "that diarrhœa at Simla, Kussowlie, Subathoo, and Dugshai, had been much diminished by improved conservancy." He also adds, "that in the Convent of Darjeeling no deaths had occurred for 13 years,

"although many of the inmates had come from the plains with advanced "organic disease."

A hundred medical officers testify to the bad sanitary condition of hill stations acting injuriously on health.

I have extracted the above passages from the evidence given before the Commissioners, and I submit they favour the doctrine that hill climates benefit the majority of diseases, even those of an organic nature. The testimony against them is neither clear nor satisfactory. The evils attending bad hygienic local conditions are confounded with effects of climate; and I believe the Royal Commissioners' conclusions have not been borne out. Deputy Inspector-General Dr. C. A. Gordon, C.B., in his valuable work on hygiene adds—in support of the Commissioners' opinion of the doubtful advantage of hill climates for sick troops—much military and medical evidence; but, even in it, good testimony is borne to the efficacy of the hill climate of India, as a curative agent.

Colonel Greathead, C.B., and Colonel Herbert, C.B., endeavour to attribute to hill climates the mortality of the 32nd and 53rd Regiments.

The Medical Officer, 29th Regiment, "praises the climate of Kussowlie "from April to September. When the men went to the Sutej campaign, the "women of the regiment were left behind, and got sourvy. The causes are "stated to have existed in the locality. The men, during the campaign, also "got scurvy. When they returned to Kussowlie, they found the bazaars had "been closed for months, their women scorbutic, supplies of all kinds scarce—"vegetables particularly so—the demand for which was not immediately felt, "nor anticipated. Except a few bad potatoes, and an onion now and then, the "men had no vegetables. The bread and meat were of miserable quality. "After the rains had set in purpura and other scorbutic affections appeared."

The 61st Regiment admits "that although the climates of Kussowlie and "Subathoo are not very good for hepatic complaints generally, they are "superior to the plains. For fever cases the climate of the hills is of the "greatest advantage. The liver cases become fewer and more tractable;" or, in other words, many got well and several improved.

The 32nd Regiment, 1854, "doubts the salubrity of Kussowlie for fever "and ague," for which the 61st Regiment reports it "offering the greatest "advantages."

The 95th Regiment, Dugshai, 1852, states: "that the men of the regiment "benefitted wonderfully—that the climate is good. The fevers were compli- "cated with liver, spleen, and diarrhoea. The appearance of the men gene- "rally is very much improved, and their health quite restored."

"The 53rd Regiment, Dugshai, 1855, "reports the climate good, and "suitable to European constitutions.

The 92nd Regiment, Dugshai, 1860, reports: "the health of the men "steadily improved, showing a steady decrease in the sick list, even in the "most unhealthy months; and at the close of the year the health of the "regiment was as good as it would have been in Scotland." Recommends "remaining during the winter, except for cases of rheumatism and syphilis."

The same regiment, in 1861, reports: "Dugshai as most healthy and in- "vigorating; unsuitable, however, to diarrhoea, dysentry, and diseases of the "heart or lungs.

"The 42nd Regiment, Dugshai, 1862, reports: "that one hot weather in "the hills was not enough to remove a bad form of fever." The same regiment, Dugshai, 1864, says: "arrived perfectly broken down from cholera and "remittent fever in 1861; 70 men in, and 120 attending hospital; left in "November, 1864, in robust health."

"Dr. Gordon, however, asks, "at what cost? 40 men died and 77 were "invalided out of 850. It made the regiment healthy by killing off and in- "validing all those who came up with weakened stamina and organic diseases."

But I would respectively submit that—

This mortality—46 in 850 in two years=27 per 1,000 per annum.

The invaliding—77 in 850 in two years=46 per 1,000 per annum.

Now the regiment was in a very bad state on arrival at Dugshai. On 13th June, 1862, there were 59 in hospital and 120 attending. In the first week after the rains set in there were 99 in hospital and 240 attending.

Total on the sick list, 339. The cases that formed this increase of 160 under treatment were hovering on the sick list, as but one week's rain sufficed to put them *hors de combat*. Were these, however, the only ones? were all the others healthy men? 27 cases of diarrhoea and 18 of fever were admitted in one week; where did the latter spring from? I think it may be taken for granted that in the first week of June there were nearly 400 sick men in the regiment. Add to these the admissions for the two ensuing years, probably amounting to 2,000, and, under all the circumstances, a mortality of 27, and an invaliding of 46 per mille, per annum, does not disparage the climate of Dugshai.

If 117 men died or were invalided, and the regiment marched from the hills in robust health, some 300 men must have recovered from very grave disorders.

I feel an apology is due for my presumption in disputing the decision of gentlemen so infinitely my superior in station and talent; but rumours have reached me that government contemplates giving up Landour as a convalescent dépôt, and I should betray the trust the head of my department placed in me in appointing me to the charge of this sanitarium, if I did not do my utmost—humble as that may be—to correct erroneous impressions regarding it.

No favourable reports on hill climates are quoted; only those are adduced which are the expression of disappointment in their curative powers, while little or no allowance is made for pollution and unhealthiness, the work of ourselves. I believe Landour owes its salubrity, and the absence of hill diarrhoea, to its being one long, precipitous hill, which is thoroughly washed down by rain; and also to the sparseness of the private houses—of which there are only 80—but each contains one, two, or three families, with perhaps ten to thirty native servants, for whom there are no conservancy arrangements; and but for the precipitousness of the hill, aiding its purification by rain, it would soon be as bad as other stations.

Hill climate is the great refuge, restorative, and cure for the upper classes in India. To an enjoyable, bright, temperate climate, they escape from the deadly plains, from intense wasting heat, perhaps 112° night and day for weeks together in their coolest houses; from malaria, fever, and all the diseases incidental to tropical climates. They enjoy pure air, good houses, excellent tables, good cooking, baths, exercise in japans, or in riding and walking; society, dancing, and amusements of every kind.

It is, therefore, impossible to believe that if soldiers, their wives and children, were similarly circumstanced, they would not be equally benefitted by the change.

But their cases are not parallel—

1st. Owing to the limited accommodation in the hills for sick soldiers, only a few, 20 to 25 per regiment, can be sent up. These are generally the worst cases, and usually present a complication of diseases. (*Vide Table and Charts.*)

2nd. The invalids who are sent up are not offered the advantages which the upper classes possess. They are more crowded together, their food is not so good or appropriate, and the cooking is inferior. At first they are not strong enough to walk about much for exercise. The conservancy is often defective, the bathing accommodation limited: they have few amusements, suffer from monotony, crave for liquor. All these are remediable defects, and must disappear in time, when government grants the requisite funds.

Only 700 square feet per man are allowed for the sick in this rarified air; the majority living in bungalows composed of a number of small, ceiled, unventilated rooms, opening off each other. Food is indifferent; mutton is issued but once a week, beef is lean and tough, and vegetables are scarce. The latter, during and after the rains, abound all over India in unlimited profusion. I would recommend these being preserved (on the Scotch method) when they are in great plenty. Their issue to the Army in the hot weather, when a green thing cannot be found in the country, would have a most beneficial effect. Cider and perry also might be made.

200 of the worst cases in the Meerut Division were sent to Landour in April 1869, for treatment. It will be seen they improved remarkably,

although under the disadvantages enumerated before, when compared with the upper classes.

No. 1 Table and the Charts show how grave and numerous were the complications the invalids laboured under. Some of the cases were hopeless ; but it was only just and merciful to the sufferers, who had given their lives to the State, to send them from the heat and torments of the plains to a temperate climate, where their last days would not be embittered by unnecessary evils. Many were invalided, and of these a good number were recovering and gaining flesh, as shown by Nos. 7 and 12 columns of Table No. 1.

In Table No. 1, column 1 shows the number in register ; 2, the age of the men ; 3 and 4, their total and Indian service ; 5, corps ; 6, diseases treated at Landour ; 7, their destination ; 8, 9, 10, 11, their weights at different periods ; 12 and 13, increase or decrease.

TABLE No. 1.

No. in Register.	Age.	Service.	Service in India.	Corps.	Diseases treated at Landour.	Destination.	Weight in Pounds.						Increase.	Decrease.
							15th April, 1869.	20th June, 1869.	20th Sept., 1869.	10th Nov., 1869.	11.	12.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.		
1	32	11	3 $\frac{1}{2}$	A | A. R.H.A.	Functional Disease of Liver, Dyspepsia, and Palpitation	Duty	144 $\frac{1}{2}$	151	150 $\frac{1}{2}$	150 $\frac{1}{2}$	150 $\frac{1}{2}$	150 $\frac{1}{2}$	6	1b.
2	31	11	4 $\frac{1}{2}$	"	Enlargement of Liver, Ague, Rheumatism, and Diarrhoea	Invalid	122 $\frac{1}{2}$	122 $\frac{1}{2}$	123	123 $\frac{1}{2}$	123 $\frac{1}{2}$	123 $\frac{1}{2}$	8 $\frac{1}{2}$	6
3	28	11	3 $\frac{1}{2}$	"	Functional derangement, Bronchitis, and Dyspepsia	Duty	139	136	136	134	134	134	2 $\frac{1}{2}$	5
4	33	11	4	"	Orchitis, Ague, Abscess, and Testis Lache	Invalid	126 $\frac{1}{2}$	126 $\frac{1}{2}$	126 $\frac{1}{2}$	126 $\frac{1}{2}$	126 $\frac{1}{2}$	126 $\frac{1}{2}$	...	2
5	35	6	3	"	Concussion of Brain	"	137	136 $\frac{1}{2}$	136	135	135	135	...	2
6	28	9	3 $\frac{1}{2}$	"			137	136 $\frac{1}{2}$	136	135	135	135	...	2
Sums	1-7	59	22			Sums	803 $\frac{1}{2}$	793	807 $\frac{1}{2}$	808	808	808	12	7 $\frac{1}{2}$
Means	31	10	4			Means {	3 Men gained	...	...	...	...	...	12	7 $\frac{1}{2}$
							3 " lost	...	...	...	...	...	...	...
7	32	14	5	D | A. R.H.A.	Phthisis, Pulmonia, and Fever	Duty	124	121 $\frac{1}{2}$	138	124	124	124	1 $\frac{1}{2}$	...
8	29	17	4 $\frac{1}{2}$	"	Enlargement of left lobe of Liver, Piles, Ague, Dyspepsia, and Spleen	"	122 $\frac{1}{2}$	123	125	124	124	124	1 $\frac{1}{2}$	...
9	35	18	5	"	General Debility and Chronic Dyspepsia	"	141	141	143	142	142	142	1	...
10	24	6	2	"	Fever	"	138	141	144	142	142	142	4	...
11	36	8	2	"	"	"	137	137	136	135	135	135	...	2
12	23	11	3	"	"	"	104	107 $\frac{1}{2}$	111 $\frac{1}{2}$	105 $\frac{1}{2}$	105 $\frac{1}{2}$	105 $\frac{1}{2}$	1 $\frac{1}{2}$	...
13	20	2	1	"	Neuralgia, and Rheumatism	"	116 $\frac{1}{2}$	114	116	117 $\frac{1}{2}$	117 $\frac{1}{2}$	117 $\frac{1}{2}$	1	...
Sums	204	66	22 $\frac{1}{2}$			Sums	683	685	913 $\frac{1}{2}$	890	890	890	9	2
Means	29	9	3			Means {	5 Men gained	...	...	...	...	...	9	...
							1 Man lost	...	...	...	...	...	...	2
14	31	10 $\frac{1}{2}$	9 $\frac{1}{2}$	B | 16 R.A.	Enlargement of right lobe of Liver, Ague, Spleen, Syphilis, Phthisis, Dyspepsia	Duty	110 $\frac{1}{2}$	112	114	124	124	124	13 $\frac{1}{2}$	...
15	27	7	6	"	Ague	"	140 $\frac{1}{2}$	138	145	148	148	148	7 $\frac{1}{2}$	...
16	27	3	2 $\frac{1}{2}$	"	Spleen	"	151	158	163 $\frac{1}{2}$	162	162	162	11	...
17	24	3	2 $\frac{1}{2}$	"	Enlargement of right lobe of Liver, Ague, Spleen, Scurvy, and Hepatitis	"	137 $\frac{1}{2}$	144	144	142	142	142	4 $\frac{1}{2}$	...
18	26	6	2 $\frac{1}{2}$	"	Enlargement of right lobe of Liver, Ague, Spleen, Scurvy, and Hepatitis	"	128 $\frac{1}{2}$	135 $\frac{1}{2}$	137	136	136	136	7 $\frac{1}{2}$	...
19	23	16	11	"	Debility and Diarrhoea	"	139 $\frac{1}{2}$	140	141 $\frac{1}{2}$	142 $\frac{1}{2}$	142 $\frac{1}{2}$	142 $\frac{1}{2}$	3	...
20	21	2	1 $\frac{1}{2}$	"	Enlargement of left lobe of Liver, Syphilis, and Diarrhoea	Invalid	128 $\frac{1}{2}$	133 $\frac{1}{2}$	134 $\frac{1}{2}$	128 $\frac{1}{2}$	128 $\frac{1}{2}$	128 $\frac{1}{2}$	...	...
21	32	7	3	C | 19 R.	Ague and Fever	Duty	137	140	142	144	144	144	7	...
22	28	7	7	"	Enlargement of left lobe of Liver, Ague, Splenitis, and Hepatitis	"	141 $\frac{1}{2}$	139	142 $\frac{1}{2}$	143 $\frac{1}{2}$	143 $\frac{1}{2}$	143 $\frac{1}{2}$	2 $\frac{1}{2}$	...

Table No. 1—continued.

No. in Register.	Age.	Service.	Service in India.	Corps.	Diseases treated at Landour.					Destination.	Weight in Pounds.					Increase.	Decrease.
					6.						15th April, 1869.	20th June, 1869.	20th Sept., 1869.	10th Nov., 1869.			
1.	2.	3.	4.	5.						7.	8.	9.	10.	11.	12.	13.	
															lb.	lb.	
23	38	20	20	C | 19 R.A.	Ague and Bronchitis	...	...	...	...	Duty	141½	138	137	137	137	...	4½
24	24	5	4	"	Dyspepsia and Palpitation	...	...	...	...	Invalided	116½	120½	115½	120	3½	...	...
25	24	2	1	"	Debilis and Scrofula	...	...	...	...	Duty	114	113½	120½	120	6	...	...
26	26	7	7	"	Ague, Splenitis, and Hepatitis	...	...	...	...	Invalided	133	133	134½	132	...	1	...
Sums	351	95½	76½							Sums	1,719½	1,745	1,768½	1,779½	68	6½	...
Means	27	7	6							Means	3	10 Men gained, each	...	...	6½	1½	...
											3	" lost, each	...	...	...	...	...
27	22	4	1½	H | 8 R.A.	Remittent Fever, Spleen, and Hepatitis	...	...	...	...	Duty	123½	117	119	120	...	3½	...
28	26	7	1½	"	" " and Neuralgia	...	...	...	...	Invalided	144	146½	147½	146½	2½	...	...
29	31	11	1½	"	Enlargement of left lobe of Liver, Ague, Spleen, and Dyspepsia	...	...	...	...	"	121½	122½	124½	123½	2½	...	...
30	33	15	7	"	Paralysis and Debility	...	...	...	...	"	150½	154½	146	153	...	...	...
31	27	7	1½	"	Enlargement of right lobe of Liver, Ague, Spleen, and Hepatitis	...	...	...	...	Duty	139	138	144½	148	9	...	...
32	34	13	1½	"	Ulcer...	...	...	...	...	"	141	139½	141½	146½	5½	...	...
33	30	13½	1½	"	General Debility	...	...	...	...	"	119½	125	123½	124	4½	...	...
34	16	2	1½	"	Fever and Rheumatism	...	...	...	...	"	77	70	78½	80	3	...	...
Sums	218	72½	16½							Sums	1,016	1,013	1,028½	1,041½	29½	3½	...
Means	27	9	2							Means	7 Men gained	...	...	...	29½	3½	...
											1 Man lost	...	...	...	...	...	...
35	26	7	7	7 | 22 R.A.	Ague, Rheumatism, Hepatitis, and Splenitis	...	...	...	...	Invalided	150½	149½	149½	147	...	3½	...
36	25	7	7	"	Enlargement of right lobe of Liver, Ague, Spleen, and Hepatitis	...	...	...	...	Duty	161	151½	162	159	...	2	...
37	29	7	7½	"	General Debility	...	...	...	...	"	158½	149½	152	145	...	13½	...
38	25	7	6½	"	Ague, Splenitis, and Hepatitis	...	...	...	...	"	148	147	152	156½	8½	...	...
Sums	103	28	23							Sums	618½	597	615½	607½	8½	19½	...
Means	26	7	7							Means	1 Man gained	...	...	...	8½	19½	...
											3 Men lost	...	...	...	...	...	...

Table No. 1—continued.

No. in Register.	Age.	Service.	Service in India.	Corps.	Diseases treated at Landour.	Destination.	Weight in Pounds.					Increase	Decrease.
							15th April, 1869.	20th June, 1869.	20th Sept., 1869.	10th Nov., 1869.	lb.		
39	48	17	17	2 | 25 B.A.	Dyspepsia and Diarrhoea	Died	119½	107½	132½	125½	1b.	...	13.
40	41	9	9	"	Enlargement of Liver, Dysentery, Dyspepsia, and Hepatitis	Invalided	115½	114½	132½	125½	...	...	...
41	19	1	1	"	Ague... left lobe of Liver, Ague, Spleen, Jaundice, and Dyspepsia	Duty	140½	155	163	162½	...	...	...
42	21	7	7	"	"	"	134½	136½	137½	136½	...	...	...
43	24	1	1	"	Enlargement of left lobe of Liver, Ague, and Hepatitis	Invalided	129	133½	128	136½	...	...	...
44	20	8	1½	"	" Liver, Ague, Bronchitis, and Dyspepsia	"	129½	122½	126½	126	...	...	...
45	20	8	1½	"	"	"	135½	129½	124½	128	...	...	...
46	18	1½	1½	"	Contusion, Ague, and Spleen	Duty	130	134	131	128½	...	...	...
47	28	8½	8½	"	Ague...	"	155	142½	138	146	...	...	...
48	43	14	14	"	Fever and Pneumonia	"	184½	186	201½	206	...	...	...
Sums	292	64½	61½			Sums	1,373½	1,150½	1,382½	1,297½	65	21½	...
Means		6½	6½			Means { 5 Men gained each ... 4 " lost, each ...	...	...	...	...	13	5½	...
49	20	2	1½	4th Hussars	Fever and Asthma	Duty	120½	122	127	125	4½	...	...
50	31	10	10½	"	Enlargement of right lobe of Liver, Ague, Spleen, and Phtisis	Invalided	121½	123	129	131½	10	...	...
51	28	10	10½	"	Fever and Diarrhoea, Ague and Spleen	Duty	123	123½	128	123	2½	...	...
52	29	11	11½	"	Ague, Spleen, and Phtisis, Diarrhoea and Scrofula	Invalided	130	124	123	126	...	...	...
53	34	11	5	"	Enlargement of right lobe of Liver, Ague, Spleen, and Hepatitis	Duty	124½	133½	131½	138	5½	...	...
54	20	1	1	"	Rheumatism	Invalided	143½	149½	146½	151	7½	...	...
55	24	2	1½	"	Enlargement of right lobe of Liver, Spleen, and Scoury	Died	131½	...	...	...	...	...	...
56	21	2	1½	"	Phtisis and Bronchitis, and Ague	Duty	121	123	126	126	6	...	...
57	20	1	1½	"	Phtisis and Bronchitis, and Ague	"	124	122	126	125	...	...	...
58	21	6	6	"	Pulmonals, and Pulpitation	"	122	131½	126	130	2½	...	...
59	21	3	2	"	Fever and Asthma	"	123	131½	134½	136½	3½	...	...
60	34	11	2	"	Enlargement of Liver, Ague, Diarrhoea, Dysentery, and Dyspepsia	"	136½	135½	123	127	...	...	...
61	20	2	1½	"	" left lobe of Liver, Ague, Spleen, and Dysentery	"	130½	132½	123	127	...	...	...
62	20	2½	2	"	Phtisis, Pulmonals, and Ague	"	131	134½	133	136½	10½	...	...
63	27	5	1½	"	Ague, Spleen, Hepatitis, and Pulpitation	"	126	134½	136½	138½	...	...	...
64	30	10	1½	"	Phtisis, Pulmonals, Diarrhoea, and Scrofula	Invalided	124½	128½	125½	125½	...	...	...
				"	" Ague, Spleen, and Syphilis	"	126	117	115	112	1	...	...
Sums	400	89½	82½			Sums	2,042½	1,933	1,937½	1,940½	52½	22½	...
Means	25	5	2			Means { 12 Men gained each ... 4 " lost ...	...	...	...	...	52½	...	...
						

Table No. 1—continued.

No. in Register.	Age.	Service.	Service in India.	Corps.	Diseases treated at Landour.	Destination.	Weight in Pounds.						Increase.	Decrease.
							15th April, 1869.	20th June, 1869.	20th Sept., 1869.	10th Nov., 1869.	11.	12.		
					6.	7.	8.	9.	10.	11.	12.	13.		
65	30	14	3	11th Hussars	Ague and Syphilis...	Duty	134	170	129	144	144	144	10	1b.
66	29	11	3	"	Insolatio	"	146	140	145	148	148	10	10	1b.
67	32	3	3	"	General Debility	"	134	134	142	148	148	14	14	1b.
68	33	4	3	"	Ague, Diarrhoea, and Cough	"	141	136	135	138	138	3	3	1b.
69	33	13	3	"	Enlargement of left lobe of Liver, Ague, Spleen, and Dysentery	"	146	146	146	145	145	3	3	1b.
70	26	5	3	"	Remittent Fever	"	121	120	126	124	124	3	3	1b.
71	27	10	3	"	Dyspepsia	"	123	127	124	124	124	6	6	1b.
72	24	6	3	"	Phthisis, Diarrhoea, Hepatitis, and Spleen	"	132	132	131	140	140	7	7	1b.
73	22	8	3	"	Enlargement of right lobe of Liver, Typhoid, and Scurvy	"	127	130	131	132	132	4	4	1b.
74	27	6	3	"	" left lobe of Liver, Ague, Spleen, and Dysentery	"	127	130	131	132	132	4	4	1b.
75	31	10	3	"	" right lobe of Liver, Ague, Spleen, and Dyspepsia	Invalid	126	123	130	134	134	6	6	1b.
76	30	11	3	"	Dysentery	Duty	126	123	126	126	126	3	3	1b.
77	27	7	3	"	Epistaxis	"	122	124	123	122	122	3	3	1b.
78	22	3	3	"	Ague, Typhus Fever, and Palpitation	Invalid	109	107	105	105	105	10	10	1b.
79	32	11	1	"	Enlargement of left lobe of Liver, Ague, Spleen, and Syphilis	Duty	116	121	127	126	126	10	10	1b.
80	23	3	3	"	Ague, Hepatitis, and Diarrhoea	Invalid	106	99	104	111	111	6	6	1b.
81	29	10	1	"	Splenitis and Scurvy	Duty	144	141	141	144	144	3	3	1b.
82	29	9	3	"	Ague and Splenitis	"	126	124	123	119	119	3	3	1b.
83	34	14	3	"	Remittent Fever, Splenitis, and Tape Worms	"	138	138	137	137	137	1	1	1b.
84	29	10	3	"	Enlargement of right lobe of Liver, Ague, Syphilis '64, and Dysentery	Invalid	148	147	145	149	149	1	1	1b.
85	31	11	3	"	Remittent Fever, Splenitis, and Tape Worms	Duty	131	134	136	136	136	5	5	1b.
86	31	10	3	"	Phthisis Pulmonalis	Invalid	138	137	137	134	134	6	6	1b.
87	24	3	3	"	Fever, Syphilis, and Debility	Duty	111	110	110	117	117	6	6	1b.
88	28	10	3	"	Anæmia	"	130	132	133	129	129	3	3	1b.
89	28	10	3	"	Tertian 1867-68-69	"	134	130	130	134	134	2	2	1b.
90	41	22	12	"	Debility	"	131	131	123	123	123	2	2	1b.
91	21	3	3	"	Enlargement of right lobe of Liver, Ague, and Palpitation	"	164	163	161	167	167	3	3	1b.
92	33	11	3	"	Febrile, Intermittent, and Asthma	"	121	121	124	126	126	6	6	1b.
93	24	4	3	"	Dyspepsia	"	144	144	147	148	148	3	3	1b.
94	22	4	3	"	Phthisis Pulmonalis and Ague	"	104	104	130	136	136	3	3	1b.
95	30	11	3	"	General Debility	"	144	146	161	154	154	10	10	1b.
96	31	11	3	"	Typhoid Fever	Invalid	127	127	133	132	132	7	7	1b.
97	30	11	3	"	General Debility	Duty	119	119	120	123	123	3	3	1b.
98	24	6	3	"	Enlargement of Liver, Ague, Spleen, Dyspepsia, and Diarrhoea	Invalid	124	124	124	124	124	2	2	1b.

Table No. 1—continued.

No. in Register.	Age.	Service.	Service in India.	Corps.	Diseases treated at Landour.	Weight in Pounds.						Increase.	Decrease.
						Destination.	16th April, 1860.	20th June, 1860.	20th Sept., 1860.	10th Nov., 1860.	12.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
99	21	3	3	11th Hussars	Phthisis Pulmonalis	Invalided	138	138½	144	148	1b.	1b.	
100	27	6	3	"	Febris, Intermittent	Duty	133	141½	142	143	10	10	
101	23	3	3	"	General Debility	"	141½	139½	138½	137½	9½	9½	4
102	23	4	3	"	Remittent Fever, Scurvy, and Burn on Knee	Invalided	120	122½	127	129	21	21	
103	24	3	3	"	Paralysis	"	134½	135½	133½	137½	7½	7½	
104	34	11	3	"	General Debility	Duty	134½	134½	141	142	7½	7½	
105	32	13	3	"	Enlargement of Liver, Ague, Syphilis, Phthisis, and Dyspepsia	Invalided	108	104½	100½	105	...	...	3
Sums	1,140	340	128½			Sums	5,352	5,301½	5,362½	5,367½	159½	159½	30
Means	27	8	3			Means { 29 Men gained 12 " lost	...	...	...	...	...	...	30
106	34	20	11	77th Regt.	Enlargement of left lobe of Liver, Ague, Dyspepsia, Spleen, and Diarrhoea	Duty	118½	127½	143	150½	31½	31½	...
107	34	16	16	"	Nyctalopia	"	147½	141½	140	138	...	...	9½
108	39	22	11	"	General Debility	"	141	141½	142	140	...	...	1
109	24	3	2½	"	Enlargement of right lobe of Liver, Ague, Spleen, Dyspepsia, and Dysentery	"	131½	135½	141	141	9½	9½	...
110	39	13	12½	"	Tertian, 1867-8	"	134½	136	132	140½	6½	6½	...
111	21	2	1	"	Diarrhoea	"	117½	112	127½	134	16½	16½	...
112	22	10	9	"	Enlargement of left lobe of Liver, Ague, Syphilis, Pileusis, and Jaundice	Invalided	110½	120½	117	129	18½	18½	...
113	24	4	3	"	General Debility	Duty	130	130½	131½	134	4	4	...
114	29	10	8	"	Ague and Spleen	Invalided	135	135	136½	136	1	1	...
115	28	10	9	"	Ague and Spleen	Invalided	139½	134½	142½	147½	8	8	...
116	41	14	1	"	General Debility	Duty	...	...	...	...	...	...	...
117	35	10	9	"	Enlargement of Liver, Ague, Spleen, and Phthisis	Invalided	133½	131½	127½	137	3½	3½	...
118	26	6	4	"	Dysentery	Invalided	142½	141	138½	138	...	...	4½
119	31	3	2	"	General Debility	Duty	122½	115½	112½	116	6½	6½	...
120	32	15	1	"	Bad Dyspepsia	Invalided	121½	123½	124	128½	7	7	...
121	32	14	9	"	Enlargement of right lobe of Liver, Spleen, Syphilis, and Bronchitis	Invalided	166½	145½	147	155	...	...	14
122	31	10	9	"	Ague and Tape Worm	"	102	102	106	100	...	...	2
123	25	5	4	"	Spleen, and Bronchitis	"	115½	117	123½	114	...	...	1½
124	28	10	8	"	" Spleen, and Phthisis	Invalided	126	119	120	116	...	...	10
125	28	14	11	"	" Hepatitis, and Dyspepsia	"	130	121½	124	129	...	...	1

ARMY MEDICAL DEPARTMENT.

Table No. 1—continued.

					Weight in Pounds.									
No. in Register.	Age.	Service.	Service in India.	Corps.	Diseases treated at Landour.	Destination.							Increase.	Decrease.
							15th April, 1869.	20th June, 1869.	20th Sep., 1869.	10th Nov., 1869.				
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.		
125	23	1	4 ¹ / ₂	77th Regt.	Enlargement of Liver, Ague, Spleen, and Cough	Invalid	106½	115½	113	116	10½	lb.		
127	28	10	9	"	Ague, Spleen, and Cough	Duty	132½	130½	125	127	10½	lb.		
128	25	9	9	"	Spleen	"	122	124	125	133	11	6½		
129	27	15	11	"	Ague, Spleen, Cough, and Hepatitis...	"	146½	148½	140½	145	14	14		
130	27	9	6	"	Ague, Spleen, Cough, and Hepatitis	"	117½	118½	116½	124	2½	2½		
131	34	14	11	"	General Debility	"	124½	122½	126	124	2½	6½		
132	31	2	1	"	General Debility	"	124½	123½	125½	126	2½	3½		
133	31	8	7	"	Enlargement of left lobe of Liver, Ague, Spleen, and Scurvy	"	141½	136½	135½	142	4	4		
134	29	10	7	"	Ague and Debility	"	127	127½	124½	131	4	4		
135	28	8	7	"	Enlargement of right lobe of Liver, Ague, Spleen, and Scurvy	"	124½	126	133	128	3½	3½		
136	30	10	7	"	General Debility	"	114½	110	110	113½	3½	1		
136	30	10	7	"	Enlargement of right lobe of Liver, Ague, Spleen, and Scurvy	"	114½	110	110	113½	3½	1		
Sums	921	306	210½			Sums	3,862½	3,819½	3,851½	3,916½	149½	45½		
Means	29	9	6½			Means	21 Men gained 10 " lost	149½	149½	149½	149½	45½		
137	33	11	...	70th Regt.	In Good Health; Wife Sick	Duty	118½	123½	124	121½	3	...		
138	34	16	...	"	Ague...	"	111	111½	118½	120	...	...
139	32	11	8	"	Ague, Spleen, Syphilis, Hepatitis, and Dysentery	Invalid	123½	121½	118½	119	...	...
140	30	10	9	"	Ague, Spleen, Syphilis, Hepatitis, and Dysentery	Duty	121½	119½	117½	116	...	...
141	28	9	9	"	Diarrhoea, Hepatitis, and Dyspepsia	Invalid	119½	116½	115½	127½	7½	...		
142	20	4	3	"	Ague	Duty	106½	107½	107½	100	...	...
143	27	9	9	"	Ague	"	146½	147½	148½	156	9½	...		
144	30	11	10½	"	Scrofula, and Dyspepsia	"	123½	123	123	127	3½	...		
145	33	9	4½	"	Delhi Sore	"	124½	123½	124½	138	13	...		
146	30	11	4	"	Scrofula and Rheumatism	Invalid	159½	164	169	161½	16	...		
147	30	9	5	"	Ague and Debility	"	133½	137½	140	137½	4	...		
148	31	13	12	"	Anæmia	"	123½	123	123	133½	6½	...		
149	42	11	11	"	Ague and Debility	"	123½	123½	124	133½	6½	...		
150	21	4	3	"	Debility and Embo...	Duty	116	114½	127½	132	16	...		
151	31	10	8½	"	Ague, Spleen, Cough, and Diarrhoea	Invalid	123	119	124	126	3	...		
152	39	14	11½	"	Ague and Debility	Duty	151	143	151	151	...	...

Table No. 1—continued.

1.	No. in Register.	2.	Age.	3.	Service in India.	4.	5.	6.	7.	Weight in Pounds.					13.
										8.	9.	10.	11.	12.	
									Destination.	15th April, 1869.	20th June, 1869.	20th Sept., 1869.	10th Nov., 1869.	Increase.	Decrease.
										lb.	lb.	lb.	lb.	lb.	lb.
163		28	10	10	79th Regt.	10		Ague and Debility...	Duty	129	182½	142	145	16	1b.
164		33	14	11½	"	11½		Enlargement of left lobe of Liver, Ague, Cough, and Diarrhoea	"	138	188½	141	146	8	"
165		21	3	2	"	2		Bright's Disease	"	129	180½	152	157	28	"
166		26	3	2	"	2		Abscess	Died	135	125	188½	137	1½	"
167		31	13	10	"	10		Enlargement of Liver, Ague, Cough, and Spleen	Duty	135½	134½	182½	130½	"	"
168		29	11	11	"	11		Ague, Diarrhoea, and Syphilis	"	131½	182½	127	130	7	"
169		28	10	9½	"	9½		Enlargement of right lobe of Liver, Ague, Spleen, and Pithitis	"	123	124½	124	124	2½	"
160		29	11	11	"	11		Ague, Splenitis, and Cough	Invalided	121½	117½	143½	142	"	"
161		22	4	4	"	4		Enlargement of left lobe of Liver, Ague, Splenitis, and Palpitation	"	142½	131½	134½	140	6	"
162		22	4	4	"	4		Ague, Spleen, and Diarrhoea	"	135	169	163	169½	10	"
163		20	10	6	"	6		Encephalitis	Duty	129	166	163	169½	10	"
164		33	14	11	"	11		Enlargement of left lobe of Liver, Ague, Spleen, and Jaundice	Invalided	120½	113½	183½	158½	10½	"
165		22	4	2	"	2		Ague, Splenitis, and Rheumatism	"	143	160½	183½	137½	4	"
166		30	15	12	"	12		Chronic Bronchitis	"	183½	123	123½	126	4	"
167		29	9	6	"	6		Enlargement of Liver, Ague, Spleen, Cough, and Diarrhoea	"	122	123½	123½	126	3½	"
168		28	5	4	"	4		" " Spleen, Cough, Jaundice, and Dyspepsia	"	127½	128	126½	134½	6½	"
169		31	9	8½	"	8½		Ague, Splenitis, and Diarrhoea	Duty	132½	162	160½	163	10½	"
170		32	15	12	"	12		Ague and Debility...	"	131½	138½	129½	138	6½	"
171		30	12	11	"	11		Chronic Rheumatism	"	160½	154	182½	158	14	"
172		23	4	3	"	3		Ague and Debility...	"	123½	131	131½	132½	4½	"
173		22	3	2½	"	2½		Chronic Rheumatism	"	143½	146½	146	160	16½	"
174		37	11	10	"	10		Enlargement of right lobe of Liver, Ague, Cough, Dyspepsia, and Diarrhoea	"	131½	132	130½	134	2½	"
175		36	6	6	"	6		Dysentery and Dyspepsia	"	120	144½	137½	140	20	"
176		19	1	1	"	1		Ague...	"	123½	141½	141½	147½	19½	"
177		23	4	3	"	3		In Good Health. Child Sick	"	149	149½	133½	133½	"	"
178		34	14	12	"	12		" " " "	"	138½	138	136	136	"	"
179		38	20	20	"	20		" " " "	"	135½	134	134	134	"	"
180		22	4	3	"	3		" " " "	"	135½	134	134	134	"	"
Sums	1,271	405	314½	7½					Sums	6,793	5,862½	5,397½	5,397½	262½	11½
Means	28½	9½	7½						Means { 38 Men gained 6 " lost "	262½	262½	262½	262½	11½	11½

Table No. 1—continued.

1.	No. in Register.	Age.	Service.	Service in India.	Corps.	Diseases treated at Landour.	7.	Weight in Pounds.					13.
								15th April, 1869.	20th June, 1869.	20th Sept., 1869.	10th Nov., 1869.	Increase.	Decrease.
					6.			8.	9.	10.	11.	12.	13.
181		31	9	9	106th Regt.	Anæmia	Invalided	84	80½	97	92½	10.	11.
182		37	13	12	"	Dyspepsia and Scurvy	"	97½	102	109	112	14½	10.
183		29	9	9	"	Scurvy	"	103½	104	100½	108½	14½	11.
184		29	9	9	"	"	"	69½	94	104½	112	18½	11.
185		23	8	2	"	Secondary Syphilis	Duty	113½	103½	117	116	14½	11.
186		30	9	9	"	Enlargement of left lobe of Liver, Cardiac Bruit, and Scurvy	Invalided	130½	130	134½	137	6½	11.
187		35	15	15	"	" " Right lobe of Liver, Ague, Spleen, and Diarrhoea	Duty	122	123½	124	125	3½	11.
188		37	9	8½	"	Enlargement of Liver, Scrofula, and Hepatitis	Invalided	127½	120½	130	127	2½	11.
189		25	5	4	"	Scrofula	"	124½	120½	124½	124½	3½	11.
190		26	5	4	"	Abscess	Duty	148½	150½	147½	152	3½	11.
191		30	5	4	"	Bad Dyspepsia	"	124½	114½	129½	131½	6½	11.
192		28	4	4	"	Scrofula	"	110	121½	113½	111	1	11.
193		26	8	4	"	Ague and Scrofula, Splenitis and Dyspepsia	"	131	132½	129	130	1	11.
194		30	9	9	"	Scrofula	"	137½	144	140½	142	4½	11.
195		36	13	11	"	Splenitis and Diarrhoea	Invalided	105½	110	110½	120	14½	11.
196		22	4	4	"	Enlargement of Liver, Ague, Phthisis, Dysentery, and Dyspepsia	Duty	71½	71½	73½	79½	7½	11.
197		14½	½	½	"								
Sums	41½	129½	119½	7			Sums	1,833½	1,835	1,891½	1,919	89½	2½
Means	28½	7½	7½	7			Means { 16 Men gained 1 Man lost	16 Men gained 1 Man lost	...	...	...	89½	2½

TABLE No. II.—SUMMARY of Table No. I.

Corps.	Age.	Service.		Total No. of men.	Total.		Average.		Increase in lbs. per 100 men.	Decrease in lbs. per 100 men.	Showing the number of invalids who gained or lost in weight.	
		Total.	Indian.		No. of lbs. gained.	No. of lbs. lost.	Increase in lbs.	Decrease in lbs.			Gained.	Lost.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
A | A R.H.A....	81	10	4	6	12	7½	lb. oz. 2 0	lb. oz. 1 4	200.	125	3	3
D | A R.H.A....	29	9	3	7	9	2	1 4	0 4½	128	28	6	1
B | 16 R.A....	27	7	6	13	63	5½	5 1	0 6	523	42	10	3
H | 8 R.A....	27	9	2	8	29½	3½	3 10	0 6½	365	43	7	1
7 | 22 R.A....	26	7	7	4	8½	19½	2 2	4 13	212	481	1	3
2 | 25 R.A....	29	6½	6½	10	65	21½	6 8	2 2	650	217	6	4
4th Hussars	25	5½	2	16	52½	22½	3 4	1 6	328	140	12	4
11th "	27	8	3	41	159½	30	3 14	0 11	388	73	29	12
77th Regt.	29	9	6½	31	149½	45½	4 13	1 7	482	147	19	12
79th "	28½	9½	7½	44	262½	11½	5 15	0 4	596	26	38	6
105th "	28½	7½	7	17	89½	2½	5 4	0 2	526	13	16	1
		306½	87½	53½	197	910½	43 4	13 4	4397	1335	147	50

In Nos. 10 and 11 columns the ratio per cent. of increase and decrease is calculated in order to facilitate comparison. Results are so easily disturbed in dealing with small numbers that great reliance cannot be placed on the calculations here shown; but the order of merit in weighing, in all instances indicates that the longer the residence in India the greater the benefit derived in the hills. This seems to hold good even amongst the bad cases, viz., those invalided, a point much against the Royal Commissioners' opinions as to the effect of hill climate upon sick men.

Column 11 shows the men longest in India to be the smallest losers.

The invalids arrive in April and return to the plains in November. On first coming up they are very weak and cannot get about well. It soon becomes too hot to be much out in the day; the rains set in in July, and end in September or October, and just when it is getting pleasantly cool and dry, and the men are beginning to go about the khuds, they have to leave. The rent of their bungalows has been paid for the entire year, and the staff is permanently attached, therefore the men not invalided could remain till the 30th March without any additional expense to government, and by residing in a magnificent climate, in the purest air, beyond the reach of malaria, many of them might be thoroughly renovated and placed in a position to undergo the following hot weather with a better prospect of health.

Most of the men who lost weight considerably were invalided, they included men who were either suffering from fatal diseases or were so far broken down as not likely to become efficient soldiers or were incurable; some however who were gaining weight and strength rapidly were invalided as they could not be returned to the plains without great risk.

The men of the 105th Regiment, originally of indifferent physique, average weight 8 stone 10 lbs., were in a very bad state from syphilis, &c., but they increased wonderfully in weight.

The number of invalids most regiments can send to the hills is far below what the Medical Officers desire; they can only send up the cases most needing the change, the others have to go on as best they may through other hot seasons; their diseases becoming aggravated and multiplied.

To take advantage of the benefits the hills offer, not only should there be no difficulty in sending thither all convalescents and weakly men who require the change, but there should be every facility for transmitting at all seasons to general hospitals in the hills such grave cases as do not recover permanently and rapidly in the plains.

Deputy Inspector-General Dr. Huntly Gordon, Meerut Division, appreciating the immense advantage to be gained over disease in this way, broke

through prejudice and custom and sent, in the middle of the hot weather, men with bad fever, spleen and liver, from Agra (where probably they would have died) to Landour. The experiment was attended with the best results. There was really little risk. The men travelled by rail to Saharanpore in one night, lying down in first-class compartments. The following night they proceeded by horse-dak and dooly, and next morning were at Landour hospital—in an English climate—and thus their comforts and prospects of recovery were immeasurably increased.

Invalids, as a rule, having consumed superfluous flesh and fat, their gaining or losing weight may be considered a fair criterion generally of improvement or deterioration. I relied on this hypothesis, in conjunction with symptoms and signs—to determine the effect of the climate of Landour on some of the chief diseases that incapacitate soldiers in India, as widely different opinions are held on the subject.

I constructed the accompanying charts aided by Dr. Maunsell, R.H.A., Dr. Sinclair, 12th Regiment, and Dr. Pringle, Bengal Service. The greatest care was taken in noting the conditions of the lungs, liver, spleen, &c., and no symptom was recorded unless we were unanimous about it. The weights, measurements, temperature, and pulse were taken by Dr. Maunsell or myself. I had no theory on the subject, and was much surprised at the results that came out. I endeavoured to proceed on facts only, suppressing opinion and theory altogether. I constructed similar returns for 1870, but was obliged to leave the station before I could complete them. The numbers dealt with are too small and the time too short to warrant positive conclusions; but I may mention that the charts of the second year gave similar indications, as far as they were finished, to those now submitted.

The first thing that strikes one in looking at these charts is the complication of diseases men laboured under.

No. 1 chart assumes to be one of ague; because ague and its attendant splenic accompaniment were the prominent affections for which the men were sent up.

A reference to columns 6 and 32 disclose the additional affections the men were suffering from, some of which are noticed in other charts, as indicated in column No. 2.

The average duration of the ague, off and on, was three years.

The 24 but slightly complicated cases did well, gained 125 lbs., on an average 5 lbs. each.

The other cases demonstrate what an intractable affection it may become in its complications, and how destructive to health; and points out the necessity of sending grave cases, without delay, from the plains to good hill climates.

Out of the 54 patients one-half, on arrival, had morning fever. No change is observable on the 20th of June; on 26th September a slight decrease is shown; but on 10th November it had almost disappeared.

Quinine, iron, and arsenic were freely administered, and, I may say here, that during my second year the practice of giving quinine hypodermically was adopted, and with almost unfailling success.

Chart No. 2 shows 27 cases treated for secondary syphilis. Complicated with all the diseases incidental to tropical service.

The men's health was greatly shattered in many cases. Deputy Inspector-General Dr. Huntly Gordon was anxious to test the effect of the climate, and on his inspection, some months later, he was greatly pleased with the general improvement of the cases.

A reference to this Chart shows the very satisfactory progress made, and indicates that syphilis does well in Landour.

I would particularly draw attention to Nos. 14, 16, 18, 111, 112, 145, 182, 184 and 196.

Chart No. 3 refers to phthisis pulmonalis.

The climate of Landour appears to be especially suited to phthisical cases. Because, 1stly, this disease does not exist amongst hill men. 2ndly.

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[To face page 240.

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<p>DATE.</p>	<p>OTHER IMPORTANT DISEASES WHILE AT LANDOUR.</p>	<p>R E M A R K S.</p>
<p>1869 .. 1869 .. Landour .. th .. tober 1869 .. ply .. July September 1869 ..</p>	<p>Orchitis, abscess, and fistula .. Splinitis Scrofulous suppuration of glands .. Splinitis, palpitation Neuralgia from wounds in skull .. Splinitis, hepatitis, diarrhoea .. Hepatitis, scorbutus Rheumatism Splinitis Hepatitis, jaundice, diarrhoea .. Hepatitis, splenitis Hepatitis, dyspepsia Hepatitis, dyspepsia, and vomiting ..</p>	<p>Invalided for orchitis. Duty, re-engaged. Duty. Invalided for debility. Duty. Invalided. Invalided for ague. Duty. Invalided for ague and spleen. Invalided for hepatitis. Duty. Invalided for hepatitis. Invalided for hepatitis.</p>
		<p>E. Y. KELLET, Staff Surgeon, Landour Convalescent Depot.</p>

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Appetite Departure, 10th November, 1869.

On arrival.	Vocal fremitus.	Per- cussion.	Auscultation.			Other impor- tant diseases at Landour.	REMARKS.
		Dullness evident over	Respira- tory murmur heard.	Creptitation heard	Bronchophony and morbidly trans- mitted heart sounds are heard.		
Fair ...	in both, most loud in apex.	Left apex most marked	Diminish- ed in left.	Over rt. and left, supra & infra clav. regions, dry frictions also gone.	Bronchophony right and left, heart sounds under both clavicles.	Bronchitis ...	Invd. for Phth. Pul. right Apex. was first attacked, the left later and more acutely. Dysp. and Liver Symptoms disappeared.
Bad ...	"	Gone ...	Normal ...	Gone ...	Appreciable, prob- ably from chro- nic thickening.	Bad syphilis, hepatitis.	Duty. Marvellous recovery. Splenic Hepat. and Dysp. Sympts. dis- appeared and scarcely a trace of Syphilis remained.
Fair ...	"	Slight, left I. C.	As before	"	Gone ...	An accidental wound that healed very tediously.	Duty. Solidification more due to tubercularization than to Pneumonia or dilated tubes, Sympts. disappd. with increase of vital capacity.
Bad ...	"	Gone ...	Rough in left apex.	"	"	Dysentery, colic	Invd. Phth. no doubt of tubercu- larization and disappnce. of deposit. Gained 10 lbs. despite his other complaints, including Chronic Scorbutic Rectal Dysentery.
"	More ...	Slight right I. C.	Bronchial right I. C.	"	As before	Diarrhoea ...	Duty. Phthisical Symptoms (tuber- cle losses) inactive, no Ague at Landour.
"	Right I. C.	Left I. C. relative.	Coarse and blow- ing right I. C.	Large right, parchment left.	Faint right and audible left.	Ague, diarrhoea, suppuration of glands(axillary).	Invd. Phth. right side recovering; left attacked, no Ague since June, Spleen and bowels normal, states he is impg., but weight, heat, and vital capacity do not confirm the assertion.
"	"	Gone ...	Normal ...	"	Normal ...	None ...	Duty. The solidification disappd. as he gained flesh and vital ca- pacity.
Fair ...	I. C.	Right I. C. relative.	Rough I. C. re- gion.	"	Both in right I.C.	Bronchitis ...	Duty. Tubercularization inactive, cause of signs of solidification not certain, no fever since arrival at Landour.
"	"	Gone ...	Slight ...	"	Slight ...	Diarrhoea ...	Duty. Same remarks as above.
"	Right	Slight right.	Increased right I. C.	Slight left I. C.	Bronchophony right, heart sounds in both.	Ague, diarr., sup- puration of many of the deep axil- lary glands.	Invd. Phth. in both lungs, no pro- bability of his ever becoming an efficient soldier, Ague per- sistent while at Landour.
Bad ...	Left I. C. marked	Most right I. C.	Tabular rt. bronchial left.	"	Both in right and left, right most marked.	Severe syphilis, (rheumatism, nodes on ster- num, orchitis).	Invd. Phth. deposit in both lungs, and the Syphilitic taint precludes any hope of his being a useful soldier.
"	"	Gone ...	Normal ...	Gone ...	Gone ...	Ague (tertian), diarrhoea, he- naria	Duty. Tubercularization slowly pro- gressed after arrival, the cough

E. Y. KELLET,

Staff Surgeon

Landour Convalescent Depot.

When those affected with phthisis go there, they almost invariably improve and often recover. This has been observed and reported on for the last forty years by different medical officers.

Perhaps the purest air breathed by man is found in the Himalayas, close to the snows. Consequently at Landour it is almost as good, except where tainted by man. Warm, dry, rarified, and having a moderate range of temperature, it is sedative, astringent and tonic, is opposed to congestion, deposits and their organization. When, therefore, it is inspired by diseased lungs, its beneficial action is not surprising. At these high altitudes the respiring of such highly rarified air causes an expansion of lung tissues, or new healthy growths, which may induce reparative action in the diseased parts. It is analogous to the effect of gymnastics.

In cases where a large amount of lung tissue has been destroyed, it is useless to send them to the hills, as distressing spasmodic dyspnoea and hæmoptysis are the results.

The men increased about 1 inch on the average in chest circumference, chiefly in the first two months. The vital capacity is noticeable—

	April 15.	June 20.	Sept. 20.	Nov. 10.
Being	1·6 inches.	2·3 inches.	2·7 inches.	2·6 inches.
Against No. 1 Chart..	2·2 "	2·5 "	3·2 "	2·7 "
" No. 2 " ..	2·2 "	2·5 "	3·1 "	3·1 "
" No. 4 " ..	2·2 "	2·4 "	3·2 "	3·2 "

Nearly two-thirds of the cases on arrival had morning fever. On 20th June considerable decrease is shown. During the rains no improvement was noticeable, but on the 10th November it had disappeared in all but 7 cases.

The Chart shows that cases 14, 50, 72, 94, 99, 106, 112, 117 and 176 progressed most favourably. I think cases 46, 51, 56, 57, 61, 72, 86 and 197, would have been benefitted by a residence here during the winter months. Dr. Maclean, C.B., Professor of Military Medicine at Netley, thinks some of these were pseudo cases, pneumonic exudation, unconnected with tubercle. Nos. 56, 94, 103, 125, 176 and 197 seem to admit of this view.

The chief treatment was perfect rest for some time after arrival. Raw beef juice and milk was given freely, also cod liver oil, &c.

Chart No. 4.

It is a very prevalent idea that it is a great error for persons suffering from fever to go to a hill climate. A careful study of Chart No. 4 will show that this is not only not the case, but that hepatic affections, not complicated with other organic diseases, do well in the climate of Landour.

APPENDIX No. VII.

NOTES ON TRAUMATIC DISEASES AND ON ACUTE INFLAMMATION OF THE BONES AND PERIOSTEUM OCCURRING AMONGST THE WOUNDED IN WAR.

By Surgeon-Major THOMAS G. FITZGERALD, F.R.C.S.

SEPTICÆMIA AND PYÆMIA.

SEPTICÆMIA is a condition due to the absorption into the system of putrid material. As a serious acute affection in gun-shot wounds, it presents itself at a very early date, frequently within two or three days of the receipt of the injury. Its occurrence does not, so far as I have been able to make out, bear any relation to rough usage in moving the injured man, nor does it seem to occur more frequently, or to be more intense in proportion, either to the severity of the bone damage, or to the extent of the open wound.

Sometimes septicæmia occurs at a later period in connection with gangrenous osteo-mylitis; but it does not appear to occur, as an early disease, more commonly in severe comminuted fractures, or in extensive shell wounds, than in slighter injuries. There is reason, however, to believe that the disease is more frequent in cases in which there is a considerable amount of contusion and laceration of soft parts, with moderate-sized external openings. It has been stated to me that septicæmia had been observed in several cases of wounds from the mitrailleuse. The disease does not seem to be produced by imperfect ventilation, overcrowding, or impure hospital atmosphere. It appears under the most favourable hygienic conditions, and has been observed to occur in an open country cart during transport in fine weather, also in an open barn in which few wounded had been placed. In many instances, the occurrence of septicæmia may be attributable to neglect of early surgical dressing, or to slovenly and improper applications. The continental method of dressing wounds by means of masses of charpie overlaid by compresses and heavy bandages, if neglected to be renewed, may favour the occurrence of the disease. The septic poisoning, in many instances, appears to take place during or immediately subsequent to the reaction, local and general, from the injury, before the surrounding vessels are closed by the inflammatory process, and before suppuration has commenced. Although septicæmia usually appears at an early period after the injury, it may occasionally occur at a later date, but it is then attributable to some accidental cause, such as the decomposition of some organic foreign substance retained in the wound. Portions of fibrous tissue, as fasciæ, &c., semi-detached, or almost wholly separated at the time of injury, are a frequent source of septic poisoning at a later period when they undergo decomposition.

Septicæmia is a definite disease characterized by distinct and well-marked constitutional symptoms, but without precise anatomical manifestations. When the septic poisoning sets in, the injured part assumes a swollen, infiltrated and discoloured aspect. The febrile action runs high at the commencement, but the fever curve soon subsides and the temperature rapidly descends, until it is lower than the normal standard. Rigors rarely occur at the outset, and recurring shiverings do not appear during the course of the affection. The urine is concentrated, and sometimes contains albumen, but the urea is found not to be in excess. The skin is relaxed and dry during the progress of the case, although in rare instances profuse perspiration may usher in the attack—the skin does not become icteroid in appearance. There is no delirium nor

mental excitement, the patient being apathetic and sluggish; but, if aroused, his mind is usually found to be sound, although dull. The disease usually runs a very rapid course, terminating fatally in a couple of days, but in some instances it may run a rather longer course, lasting six or eight days, and more rarely the patient may survive two or three weeks.

On *post-mortem* examination, in cases of septicæmia, no distinctive anatomical characters are found. The condition of the injured part depends on the period the patient has lived; the surrounding parts may be infiltrated with fluids of various kinds; or if the disease has not proved rapidly fatal there may be extensive suppuration, but the latter condition does not appear to be a part of the disease in question. There are no multiple abscesses in viscera, nor usually metastatic abscesses in the joints or limbs. The blood is dark-coloured and loaded with bacteria. The spleen is friable and distended with dark tawny blood, in some instances filled with dark black-currant-jelly-looking material studded with harder masses and nodules, so that when exposed to a stream of water on section the black jelly-like material is readily washed away, leaving the interspersed nodules standing out. The liver is engorged with blood. In cases of prolonged duration there may be diffuse pleurisy on one or both sides with corresponding infiltration of the lung tissue. The lungs may be almost black in colour, infiltrated with blood, containing little air, and pulmonary tissue stained with the colouring matter of the blood. There may be hæmorrhagic patches in the intestine. These conditions may be owing to attempts on the part of the system to excrete the morbid material by means of the pulmonary or intestinal mucous membrane.

Pathology of Septicæmia.—The septic agent, whatever it may be, appears to be derived from the wounded surfaces, or from the parts in the immediate vicinity thereof, being produced during the early stages of decomposition, or the first chemical changes which occur in the effused blood, crushed tissues, and disordered fluids of the soft parts. The nature of this agent, as well as its mode of action on the organism, is quite unknown. There is no sufficient reason for believing that its essential power depends on the presence of either sepsin, leucin, or butyric acid, nor on any compound of ammonia and hydrogen with sulphur; but whatever the medium or active principle of the septic influence may ultimately prove to be, it is very probable that the production and rapid generation of bacteria will be found to be a necessary element in the process, or at least an invariable accompaniment of septic intoxication.

The septic agent is probably taken up and intensified by the amoeboid activity of the emigrant colourless blood corpuscles, which permeate the neighbouring tissues in the early efforts at local repair, and is conveyed into the circulation by them as they wander towards the lymphatics. After suppuration is established, there is much less liability of absorption of morbid material, as it has been proved that granulating surfaces may be dressed with putrid organic matter without producing any serious injury to the system; but even in cases of granulations, septic matter may penetrate by means of the retrograde cell movement of certain pus corpuscles. In such instances, however, the quantity gaining access to the circulation would generally be insufficient to produce acute septicæmia, unless the septic influence have been much intensified by exceptional circumstances. Acrid discharges in contact with the granulating surface, necrosed splinters of bone or foreign bodies roughly manipulated, and similar causes, may lead to the young granulation tissue being damaged, by which any septic agent accidentally present may enter the circulation and produce septicæmia,—at a late date subsequent to the infliction of the wound, and when the occurrence of such a calamity is not expected by the Surgeon who has charge of the case.

In other instances, the disease may be produced at a late period by the breaking up of a putrifying venous thrombus; or it appears in connection with gangrenous osteo-myelitis and osteo-phlebitis. In such cases, dark-coloured metastatic nodules may be found in the pulmonary tissue; but instead of undergoing suppuration, and forming regular multiple abscesses, as in pyæmia, they become gangrenous.

Pyæmia.—I understand by this disease a general condition intimately and necessarily connected with the formation of pus—the disease not appearing unless well-marked local suppuration has been established, and its progress being

marked by the production in distant parts of purulent collections—circumscribed or diffused. The phenomena of this condition as an acute and pronounced affection, are usually not observed until a medium or rather late date. The characteristic symptoms in most cases often appear between the 12th and the 20th day after the injury has been inflicted. If it occurs at a later date it can usually be traced to intercurrent traumatic inflammation set up by some accidental circumstances or other ascertainable cause.

Pyæmia arises most frequently by far in serious gun-shot injuries of bones and wounds of joints; and its occurrence appears to be greatly favoured by transport of the wounded man, especially if he have been subjected to rough handling during such removal. It occurs in severe gun-shot fractures that have undergone transport even when subsequently treated under the most favourable hygienic conditions. I have observed it in well-ventilated hospitals, in private houses, in tents and huts. On one occasion I noted its occurrence in a case of secondary amputation of the arm, where the patient occupied a bed placed lengthways under an open window, the weather being fine. The room, of considerable size, was situated on the first floor of a modern private-house with a door in the opposite wall, and only one other patient occupying the corner on the other side of the fire-place. The disease appears under the most diverse circumstances, and its direct production does not appear to be dependent on impure air—hospital miasma or overcrowding; although these unfavourable conditions when present doubtless render the patient less able to resist the onset and fatal progress of the affection.

There is no guarantee that a wounded patient can be preserved from pyæmia by the most complete isolation, by the purest air, or by the best nursing; but he may be ensured considerable safety by primary amputation before removal from the field and by careful subsequent surgical treatment, including extreme cleanliness in dressing, of ward utensils, and other considerations necessary to the proper sanitary treatment of wounds.

The disease appears to be developed at a certain period and in certain conditions during recovery from serious injuries; most frequently, but not invariably, where osseous tissue is extensively involved. Pyæmia is often preceded by osteo-myelitis, and probably in many instances a pathological connection may exist between the two conditions. Some surgical authorities have maintained that pyæmia and osteo-myelitis were identical diseases, or, at least, invariably and necessarily connected with each other. But that no such essential relationship exists is evidenced by pyæmia proving fatal in many instances where the medulla has been severely injured and yet no osteo-myelitis is found on *post-mortem* examination; and on the other hand, cases have occurred in which multiple abscesses have existed in the marrow of the injured bone, where no metastatic abscesses were present and where no pyæmic symptoms were observed. Indeed, osteo-myelitis may run its full course to a fatal termination without pyæmia being manifested. The main factor in the causation of pyæmia appears to be purely and entirely personal.

When a wounded man is attacked by this disease he owes the occurrence to some cause or causes within himself and in connection with his injury—extensive supuration of the wounded parts being the usual antecedent to the production of the disease. In a patient suffering from two or more injuries, one may continue to progress normally towards healing, notwithstanding the appearance of pyæmic symptoms, whilst the other wound, supposed to be connected with the production of the general disease, takes on excessive or unhealthy action. I have observed over and over again, in various places and at different times, that for many days after a number of recently wounded first came under treatment (after the most serious cases had died) they appeared to be doing well enough, pyæmia not being noted; but after the lapse of a certain time this disease appeared on all sides and attacked apparently promising cases treated under the most favourable hygienic conditions.

Generally about a fortnight after a number of recently wounded were admitted to a hospital, the Surgeons began to talk of pyæmia attacking cases that were previously progressing favourably; and as the disease appeared in numbers of cases in rapid succession, they began to despair of saving any of their patients, speaking of pyæmia as the scourge and plague of military surgery. At such times, the occurrence of the disease is attributed to every conceivable cause—to

overcrowding, to dirt, to dung-hills, to impure hospital air, or to importation with other cases. But after the lapse of a further period of ten days or so, if no more recently wounded or roughly transported fractures had been admitted, the disease ceased to appear, unless as an exceptional instance, often capable of explanation. In stationary hospitals, where further admissions of more or less recently injured men took place, pyæmia continued to prevail; but successive outbreaks of the disease corresponded to the several influxes of patients, and the appearance of the first pronounced symptoms, in the majority of instances, dated within a certain period from the original hurt, or some subsequent date, such as that of operation, or severe handling in transport. Often the outbreak of pyæmia in a field or fixed hospital may be attributed to the advent of patients from another field hospital which may have been evacuated; such patients when received being often in a very dirty and unsatisfactory state, with their wounds ill-dressed or neglected. But on careful investigation, I have usually found that the appearance of the disease, both amongst the older patients and the new arrivals, corresponded to a certain stage of the wound and to a certain period from the date of the injury. The practice of evacuating a field hospital, on another hospital or ambulance, is calculated to cause much perplexity and complications in surgical statistics; and in considering the circumstances which lead to the appearance of a disease like pyæmia amongst wounded men, it is necessary to bear in mind the date of the original injury as well as of surgical operations, rather than that of the man's admission into the hospital or ambulance in which he becomes pyæmic.

Pyæmia is not contagious, nor does it appear to be transmissible from one locality to another, or that it is introduced into a ward from without. It does not seem to be of the nature of what is understood by epidemic; but its prevalence and intensity are certainly favoured by moisture and by a low damp situation. There was evidence of this amongst the French at Metz, and, to a less degree, among the Germans blockading that fortress.

The appearance of pyæmia does not seem to be necessarily, or even commonly, associated with the prevalence of the other diseases that attack wounded men—such as erysipelas, hospital gangrene, trismus or tetanus, and traumatic delirium. During the late war pyæmia was very general, and prevailed most extensively in hospitals and districts where not a single instance of these diseases occurred. In cases of gangrene, pyæmia does not occur until the gangrenous action has entirely ceased and suppuration has become thoroughly re-established, and the periods at which erysipelas and pyæmia are severally most prevalent do not correspond.

Pyæmia bears a close affinity to simple inflammatory and suppurative fever, and there may be some doubt or uncertainty in diagnosing the former disease at a very early stage, as the boundary line between the two conditions is frequently undefined for a few days; but when developed, there is no clinical difficulty in coming to a conclusion as to the existence of pyæmia. For some days previous to the occurrence of the initiatory shivering which shows that pyæmia has probably set in, the wound and surrounding parts display well-marked characters of full and more or less extensive suppurative action; and not unfrequently the first rigor, followed by profuse perspiration, occurs a few hours after an opening has been made for the evacuation of pus from the wound or its vicinity. The patient becomes anxious, depressed, restless, with increased sensitiveness to pain, and is wakeful during the night. There is no mental dulness or tendency to insensibility. But the most marked and constant symptom of pyæmia is the frequent occurrence of rigors. Repeated shiverings, of very varying duration, occur at very irregular intervals, but are generally frequent. These rigors are followed by hot, dry stages and profuse perspirations. The temperature of the body rises high at the outset; and although the fever curve descends suddenly from time to time, it rises again as rapidly, usually maintaining a high general level until towards the end, when the temperature falls low, but even then marked evening elevations occur. The heat of the body, as registered by the thermometer, rises with the commencement of the shivering fit, reaching its maximum in the subsequent dry, hot stage. In some instances the maximum attained is stated to be very considerable—as high as 110° Fahr.; but usually it does not at any period exceed 104°. In cases in which the profuse sweatings are frequent, the fever curve seems not

to mount high. Owing to the irregularity in the time of occurrence of increased temperature in pyæmia, some difficulty is experienced in field hospitals in ascertaining and recording the changes. In great numbers of the German hospitals, however, during the late war, a slab was placed at the patient's bed-head, and the temperature was written up at frequent intervals, thus securing materials for a regular record of the fever curves in pyæmia. The conjunctivæ and skin assume a peculiar dusky, yellowish, or icteroid colour, and the breath has a faint hay-like odour. The latter symptom certainly did not, however, strike me as of very frequent or marked occurrence in pyæmia amongst the German or French wounded during the late war. The features become pinched, and emaciation rapidly takes place, especially of the sub-cutaneous tissues of the neck and upper part of the thorax. The patient becomes rapidly and markedly debilitated. The duration of the disease varies: it may terminate fatally in a few days, or the patient may survive some weeks.

Morbid Anatomy of Pyæmia.—On *post-mortem* examination, secondary abscesses are found in the viscera, especially in the lungs, but also in the spleen and liver. In the lungs are found the conditions known as red infarctions, running on to the formation of secondary abscesses in various stages.

In the spleen similar appearances are observed, the indurated portions being wedge-shaped, with the broad end outwards and the narrow part inwards. There may be abscesses in other organs, and multiple abscesses may be found beneath the skin or in the textures and diffuse purulent collections in various parts, as the joints; or a large joint which during life had presented the appearance of having been the seat of diffuse suppuration, may present only increased vascularity and be distended with a non-purulent fluid. Thrombi are found in various parts, especially in the neighbourhood of the injury and in large veins in dependent positions, or in situations in which the motion of the blood may have been retarded, as in the flexions of joints and passing under fasciæ, ligaments, &c.

Pathology of Pyæmia.—This disease does not depend on the presence simply of pus in the blood, for we know that healthy pus may be introduced into the circulation in considerable quantity without producing the disease, or indeed any serious harm to the system. Pyæmic pus injected into the veins of a dog will produce symptoms of commencing pyæmia, but will not produce a condition running the ordinary course of pyæmic disease. To renew the symptoms it is necessary to repeat the injection of pyæmic pus. But although pyæmia is not produced by the actual presence of pus in the blood, its origin, its progress, and the recurrence of the symptoms appear to be closely connected with purulent formations. The disease does not appear until after suppuration has been well established, and its course is characterized by the production of purulent deposits. The essential histological condition in pyæmia appears to be the presence in the system of excessive quantities of lymphatic elements. The lymphatic vessels and glands are gorged with these elements, the blood frequently contains an increased proportion of white elements, and the red blood corpuscles are disordered in function and often diminished in number. In the osteomyelitis, frequently and apparently intimately connected with pyæmia, the free granular marrow cells of infancy are again produced with great rapidity and in large quantities.

The medulla of bones being regarded as a lymphatic structure, more or less closely allied to the glandular division of the lymphatic system, the rapid development of enormous quantities of embryonic elements shows that there is a tendency to irritation and morbid formative action in that constituent of the intermediate apparatus of nutrition.

Further evidence of the excessive nutritive activity of the lymphatic and corpuscular elements of tissues and organs, which characterises the progress of pyæmia, is seen in the pathological histology of the diffuse metastatic suppurations occurring in large articulations such as the knee-joint. The synovial membranes may be now classed with the lymphatic structures, and it seems probable that these diffuse pyæmic suppurations of joints are to be attributed to embolism of the lymphatics, the obstructing emboli consisting of extremely fine particles, either themselves possessing some morbid irritant quality or conveying some specific agent. Doubtless in the commencement of this complication, the amoeboid elements are derived from the blood-vessels by emigra-

tion of the colourless blood corpuscles, and by proliferation of these, but the cellular constituents of the synovial fringes must also furnish a considerable proportion of the pus corpuscles.

If the patient die in an early stage of the disease, the synovial membrane is found to be thickened, injected irregularly, and at certain points hæmorrhagic, but at this period the cartilages are not damaged. If, however, the progress of the disease have been less rapid generally, and the patient survive a longer time, a very different condition of matters may prevail. The articular cartilages become destroyed, in many instances stripped almost entirely down to the calcareous layer of the head of the bone. In such cases the destruction of the cartilage is affected mainly, if not entirely, by extreme nutritive activity of its corpuscular elements, which in all probability will be proved ultimately to depend on irritation of lymph-paths and lymphatics permeating the cartilaginous structure, or of excessive nutritive activity of the protoplasm contained therein. The histological phenomena of the destruction of the cartilage are the following:—The large mother capsules rapidly enlarge, and become distended with great numbers of young cells, which are rapidly produced by division and proliferation of the enclosed cartilage corpuscles. The secondary capsules (considered erroneously by Redfern and other observers to be cell walls) undergoing destruction become broken up, and are soon lost in the accumulating mass of new amoeboid corpuscles filling the primary mother capsules. These collections of new cellular elements are arranged in an elongated form, corresponding to the normal arrangement of the primary capsules, in the same way as in traumatic or acute ordinary arthritis; but the cells are produced with much greater rapidity and in very much larger quantities, so that the mother capsule becomes enormously distended, with a considerable number of cells pressing on each other, but not differing from pus corpuscles. The intervening cartilaginous matrix at the same time exhibits numerous striæ, arranged more or less in a linear manner. It then softens and undergoes destruction, the primary capsules being opened by the process; and the crowd of cells within being emptied upon the articular surfaces, they mingle with and add to the pus corpuscles, from which they cannot be distinguished.

The microscopical investigations of various observers during the last few years have caused a considerable modification of the views previously held regarding the mode of production of suppuration in the tissues and organs; and these observations, when thoroughly followed out, will probably lead to a revolution in our opinions regarding the pathology of pyæmia. In the suppurations in this disease, both of the wounded part and vicinity, as well as in distant textures, there is little or no tendency to the formation of granulations or of a pyogenic limiting tissue. The collections of pus are either infiltrated among the textures, or, if more or less circumscribed, the boundaries are formed of condensed, and to some extent altered, layers of the tissue of the part in which the suppuration takes place. In all these instances the newly-formed embryonic tissue displays no tendency to the formation of granulation tissue, and still less do the new cells evince a disposition to assume the characters of the tissues amongst which they are formed.

In what may be deemed the normal state of the blood, two descriptions of colourless corpuscles are observed. In one kind, the best-formed and most perfect, each corpuscle contains a single spherical or oval-shaped nucleus, which is rendered more sharply defined by the action of acetic acid, and possessing a nucleolus which is deeply coloured by carmine. In the other variety the nucleus is broken up into several fragments by the addition of acetic acid, or even before the application of this re-agent a multiple nucleus is observed, the divisions being irregular, and often more or less angular in shape. The corpuscles, with a well-defined, rounded, single nucleus, are considered to be in full vital or organic vigour; and the latter, with several nuclei, are conjectured to be retrograding. Subsequently it was observed that when the blood is saturated with carbonic acid, all the single nucleated blood corpuscles become multinucleated, and finally perish.

Similar microscopical differences exist between the newly-formed, well-developed cells of embryonic tissue, and what are known as pus corpuscles. As the nutritive vigour diminishes, the nuclei seem to divide, without a corresponding proliferation of the protoplasm; but the fluid denominated pus

varies much in its corpuscular elements. In good laudable pus we find a very large proportion of single nucleated cells, which exactly resemble embryonic cells, or well-formed uninuclear white blood corpuscles; whereas in thin ill-conditioned, sanious pus, furnished by a non-granulating surface, there is a predominance of granular elements, albuminous particles, and oil globules, the debris of disintegrated or imperfectly formed pus cells.

The corpuscular elements of inflammatory exudation are derived mainly from the distended blood-vessels, consisting of migrated white blood corpuscles or of their proliferations. Suppuration is a simple extension of this process, the pus cells being formed by proliferation of the migrated corpuscles, with perhaps some addition from the nutritive activity of the cellular elements of the part in which the inflammatory infiltration or exudation has taken place. The suppuratory extension of the process being accelerated by the presence of any irritant, or of any irritating quality in the exudation. Chemical agents, mechanical particles, or organic ferments are known to conduce rapidly to suppuration.

In cases of serious gunshot fractures, numerous dépôts, varying in size, of inflammatory exudation, are formed in the soft parts in the vicinity, many at some distance from the seat of injury. These inflammatory infiltrations more frequently evince a tendency to run on to the suppurating stage than to terminate in either resolution or organization. Hence numerous scattered suppurating points, which are not surrounded by any limiting membrane or granulating surface, exist in the neighbouring soft parts, affording an extensive purulent addition to the abundant suppuration which is seen at the actual seat of injury. After some days or weeks, the quantities of pus that are formed and poured out in suppurating gunshot fractures is prodigious.

In this extensive production of amœboid cells, doubtless a certain proportion of the corpuscular elements, with irritant cell-derivatives, wander into the lymphatics and return to the circulation. The pyæmic process may possibly be set up by infiltration and distension of the lymph-paths by the rapid production of such amœboid elements possessing irritant qualities and excessive nutritive activity of a low type, as well as by the passage along the lymphatic vessels, during a lengthened period, of considerable quantities of protoplasmic fragments and corpuscular debris,—such amœboid elements and particles being poured into the circulation at frequent intervals; or perhaps an irritant morbid entity may be formed in the damaged parts during the process of suppuration, and possibly in connection with tissue changes; but of the actual existence of such a morbid agent, or of its nature and properties, if it exist, nothing is yet known. It may be marsh gas— $C H_4$ —which we know can be artificially produced by bringing its elements together in a nascent state; or it may be another hydrocarbon, acetylene— $C_2 H_2$ —which is formed by direct unity of its elements under the influence of electricity; or it may be one of the compounds of a hydrocarbon with oxygen, for instance a compound or derivative of formic acid— $C O_2 H_2$ —the pungent irritant of the nettle and red ant.

We are also unacquainted with the connection, if any, between the commencement or progress of pyæmia and the generation of bacteria in the injured parts, or of the introduction of these bodies into the circulation.

The secondary suppurative phenomena of pyæmia are due to obstruction, depending on either capillary or lymphatic embolism; the latter, as already mentioned, leading probably to metastatic purulent formations in the articulations, or to diffuse inflammation and suppuration of the soft parts at a distance from the seat of injury; and the former causing multiple abscesses in the lungs and other viscera. In some instances, in which secondary amputations were performed through inflamed parts in the vicinity of the injury, after symptoms of pyæmia had already commenced, a very unusual dense infiltration of embryonic elements into the surrounding muscular tissue was observed. This is mentioned further on, under the heading of acute exudative infiltration of injured soft parts.

In consequence of the existence of an excess of lymphatic and white blood elements, the blood may be more coagulable on the slightest retardation or arrest of its circulation. The formation of thrombi in dependent positions, in osseous structures and under ligamentous bands may be attributed to the circulation in these situations being somewhat retarded, and the blood being more

disposed to form coagula. A thrombus will even form on the side of the body opposite to the seat of injury, if the position of the patient has been such as to delay or obstruct the circulation at the site of the coagulum.

These thrombi certainly lead to the formation of secondary purulent deposits. But it seems likely that pyæmic abscesses in the viscera as well as multiple abscesses in the subcutaneous textures, and diffuse metastatic abscesses in the joints and limbs, may occur without the previous formation of a thrombus.

WOUND DISEASES: ERYSIPELAS, HOSPITAL GANGRENE, AND EXUDATIVE INFILTRATION OF INJURED SOFT PARTS.

Traumatic Erysipelas.—Traumatic erythema and inflammatory blush, extending more or less rapidly over the cutaneous surface, often in connection with spreading suppuration beneath, was common enough; but true erysipelas was a very rare disease in the German military hospitals visited by me. In many localities this disease did not appear in a single instance, and this exemption from outbreaks of erysipelas was remarked after some of the most severely fought battles in the early part of the war. Towns and entire districts in which large numbers of wounded from these engagements came under treatment did not present a single instance of traumatic erysipelas, and even in some localities where the disease did appear, only a few sporadic cases occurred. The disease did not appear as an epidemic, and it did not spread. But at stationary hospital establishments, even those composed of wooden huts, after being occupied by a succession of wounded men, occasionally became invaded by the disease. At Mannheim, where the hospital establishment was most excellently constructed, and very favourably situated outside the town, an outbreak of erysipelas, in an intense and fatal form, occurred after some of the huts had been fully occupied by a series of wounded for some time. There is no doubt that erysipelas is as likely to appear in detached wooden huts that have been continuously occupied by wounded for any length of time, as in permanent buildings used as hospitals. There is, however, an advantage in employing temporary wooden structures for the accommodation of wounded men, viz., in the event of erysipelas or other wound-disease breaking out, the infected hut or series of wooden structures may be at once removed and burned. Traumatic erysipelas arises from influences external to the patient, and its occurrence does not depend on any particular condition of the wound. The disease may attack a wound at any stage, either recent, suppurating or healing. It may be epidemic, and is highly contagious. The specific poison of this disease spreads through the atmosphere, or may be carried from place to place, or from case to case, on the surgical instruments, dressings, or frequently by the surgeon himself. It does not arise from decomposing blood, retained pus, or neglected dressing, otherwise it would not have been so infrequently met with in the German hospitals. The disease was seldom observed amongst the numbers of German and French wounded, who during transport to the stationary hospitals were several days without having their hurts dressed, or receiving surgical attendance. But the disease was common amongst the wounded French under treatment in Metz, especially in the temporary hospitals established in the low-lying portions of the town, and damp localities in the vicinity. In some hospital establishments in Metz I was informed nearly every wound was attacked by erysipelas, and the disease was more or less prevalent in most of the hospitals there, with the exception of the regular hôpital militaire, which enjoyed a remarkable immunity from wound-diseases.

Hospital Gangrene—Diphtheria of Wounds.—In the wars of the last and commencement of the present century, this disease was very prevalent, and most fatal to the wounded. All descriptions of injuries, even very slight wounds, and cases of surgical operation in every stage of recovery, up to perfect healing, were commonly attacked by gangrene, often in a severe and most destructive form. Frequently the most promising cases unexpectedly took on gangrenous action, and terminated fatally, in such a way as to cause great anxiety to the Surgeon in respect of his remaining patients. The disease was, moreover, apt to prevail amongst wounded prisoners of war; and this was observed so lately as the recent American rebellion, when

hospital gangrene raged to an extreme degree amongst the Federal soldiers in the military prison at Andersonville, in the Confederate State Georgia.

During the late war, so far as my knowledge of the German armies extend, this disease has been of extremely rare occurrence, either in an epidemic form, or as sporadic cases. In very few hospitals does it appear to have occurred in any shape, either amongst the German troops, or amongst the vast numbers of prisoners of war. A few instances were observed in some of the field-hospitals before Metz, especially at Ars-sur-Moselle; and some scattered cases occurred in various field and stationary hospitals. But in no instance, during the entire campaign, did the disease present itself in such proportions as it did during the contest between the northern and southern States of America.

In one instance that came under my observation, hospital gangrene having appeared in a reserve hospital, the building was cleared out, and not subsequently used; but after an interval of some weeks the disease reappeared among the wounded in the wooden huts erected in the vicinity. These isolated cases occurred in various huts scattered over the ground, and separated from each other by other huts in which the disease did not appear. The huts in which the disease arose were not overcrowded, or in a more unsanitary condition than the others in which it did not occur. The disease not unfrequently appeared to attack men who had nearly recovered from their injuries, and were at the time moving about freely in the open air during the daytime. One case I saw was a French soldier who had undergone amputation of the leg below the knee; the operation had been successful, and the stump was nearly healed, the patient was moving about freely in the open air, as he described himself "nearly cured," when attacked by gangrene. At Mannheim the disease occurred in detached huts erected in the open country. Hospital gangrene has been supposed to be more prevalent in warm climates, and in summer than in colder temperatures. I saw no evidence of this during the late war.

This disease is a special condition which attacks wounds irrespective of the stage or condition in which they may be at the time. It is communicable from one wound to another, and may be carried from place to place by surgeons, nurses, or on the dressings and instruments. It appears, however, to be less infectious than traumatic erysipelas, and, unlike the latter disease, does not appear to be specially prevalent in huts or establishments that have been occupied for some length of time. The occurrence of the disease appears sometimes to be connected with a particular supply of dressings, such as charpie, and probably the disease was more common formerly, because old rags and hand-made lint were used, whereas now, machine-made dressings are in general use, and various disinfectants are freely employed. Stimulating lotions, such as camphor, are used locally; but the best of these applications appears to be a saturated tincture of iodine or bromine. Permanganate of potash or carbolic acid seems to have little, if any influence.

Acute Exudative Infiltration of Injured Soft Parts.—A peculiar anatomical condition after secondary operations was observed in the late war. It is characterized by dense whitish-grey infiltration and induration of the deeper structures of the limb. This condition particularly affected the muscles of the part. Sometimes, nearly the whole muscular substance in the neighbourhood of the wound was thus affected throughout, and in other cases the infiltration existed chiefly in the muscular tissue around the bone. The muscular and other tissues appear to be infiltrated with a dense, tough diphtheritic material, probably composed of wandering white corpuscles, granular matter, and other lymphatic elements. The textures become dense and indurated and rigid, and on section the surface is pale and lardaceous. In other instances, the induration from infiltration is less dense; and interstitial hæmorrhage appears to occur, giving an appearance on section similar to what was formerly termed fungus hæmatodes. This last form was especially observed around the bone, extending, however, to a broad, and well-marked distance into the surrounding textures. This disease usually occurred within a short period of the operation, and in men previously suffering from pyæmic symptoms. There was no inflammatory redness around the wound, the surface of which assumed a pale, ashy-grey appearance. The patients who were the subjects of this disease invariably died.

OSTEOMYELITIS, SIMPLE, SUPPURATIVE, AND GANGRENOUS, AND TRAUMATIC PERIOSTITIS.

Osteomyelitis.—In field surgery, this process may be studied under two different conditions :—one as it occurs in cases of gun-shot fractures, in which an effort is made to save the limb, the other as it appears in connection with the cut or sawn ends of bone in instances of surgical operations. In the simple and minor form, osteomyelitis may be regarded as a reparative process, rather than as a disease. Direct union of broken bone must be of rare occurrence at any time, and in the case of gun-shot injury can hardly be expected to occur, even under the most favourable circumstances. The most particular inquiries of the numerous surgeons attached to the various hospitals visited by me, failed to elicit any evidence of such having been observed during the recent war. On all sides, the general testimony was that suppurative osteomyelitis invariably occurred in a greater or less degree in connexion with the healing of gun-shot fractures. Still, certain cases are met with in which you observe healing of some portions of a bone splintered by gun-shot injury, with a less pronounced form of osteomyelitis, or in which the suppurative action has been limited to certain small and irregular fragments more or less detached. Hence osteomyelitis has been divided into simple and suppurative, a third advanced grade being designated the gangrenous variety of the disease.

Simple osteomyelitis, as already stated, at least in the less intense grades, is more a reparative process than a disease. It is met with in the most favourable cases of gun-shot fractures. Pirogoff some time since described this condition as being accompanied, early in the process, by red hepatisation of the tissue involved. Invariably at the commencement, there is induration with more or less darkening in colour of the medullary tissue of the bone, and a tendency to protrusion of the marrow in cases in which the medullary canal is freely open. The darkened colour varies from a brownish yellow, through various shades of red, from the brightest tint to the deepest discolouration. This increased red tint, and deepening colour of the marrow, depends partly, of course, on augmented vascularity of the tissue; but also greatly on the vastly increased proportion of free amœboid elements, which appear to be produced in great numbers, and with excessive rapidity. The normal yellow colour of the adult marrow disappears as the fat is removed. One of the earliest and most decided signs of the existence of osteomyelitis is the appearance in the matter discharged from the wound of free fat globules pressed out from the marrow; and there is no doubt that the fatty elements so predominant in the adult marrow rapidly diminish in osteomyelitis. This disappearance of the fat is effected partly, perhaps, by absorption; but doubtless mainly by the oil, after leaving the adipose cells, being forced away under the pressure of the rapidly-increasing embryonic cells, as well as of the enlarged blood-vessels and formation of intercellular substance.

The dark red colour seen in some instances is partly heightened by small hæmorrhagic apoplexies of the marrow, the blood being effused at one or more points by the giving way of some of the small blood-vessels.

The hardening and protrusion of the medullary tissue is attributable, in fact, to the excessive production and rapid proliferation of enormous quantities of embryonic cells, some of which at the same time undergo a peculiar adjustment towards each other, giving the appearance of elongated fibres.*

The following histological changes occur. As stated above, embryonic tissue is formed in great abundance in the medullary spaces and Haversian canals. The observations of Cohnheim would lead to the supposition that these amœboid elements come entirely from the blood vessels,—by emigration and subsequent proliferation of the colourless blood corpuscles; and doubtless, at the commencement of the process, such is the chief, if not the only, source of

* I would here venture to suggest that every Army Corps should be accompanied by a morbid histologist, who should be provided with the necessary appliances and instructed to devote himself to microscopical researches. A young medical officer specially trained and placed on the staff of the Principal Medical Officer might render real service to surgical science.

the amoeboid cells; they are also probably produced by proliferation of cells in the perivascular spaces, and certainly appear in crowds along the vessels in the Haversian canals and in the vicinity of the medullary capillaries. In addition, however, to this source of amoeboid cells, the new embryonic tissue is largely produced by increased nutritive activity of the corpuscular constituents of the medulla and bone.

The many-nucleated large mother cells of the foetal marrow again appear in considerable numbers. These myeloid cells become distended with active contractile protoplasm; the nuclei increase in size and divide; portions of the protoplasm, each enclosing a nucleus, project from the circumference of the cell; these projections, gradually separating, become detached, and new embryonic elements are produced by gemmation. The small round medullary corpuscles also multiply very rapidly, producing embryonic tissue in considerable quantities. The fat cells of the adult marrow undergo rapid histological transformation, the oil disappears, the contractile protoplasm increases in quantity, and the nucleus enlarges and multiplies by division and sub-division until the cavity of the original fat-cell becomes completely filled with new embryonic elements, which subsequently become free by the destruction of the old cell-wall, or by the exercise of their own amoeboid qualities. There is little, if any, intercellular material in the normal marrow tissue, and the oil which leaves the adipose cells is rapidly forced away by the pressure of the rapidly-increasing embryonic elements; the inflamed adult medulla re-assumes, at the commencement of the process, the appearance of the red foetal marrow.

As proliferation of the cells proceeds the marrow becomes swollen, dense, and the corpuscular elements press against each other. Active hyperæmia exists, and around the circumference of the medullary cylinder granulations form. The small quantity of connective tissue around the blood vessels and in the Haversian canals may add to the amoeboid elements by proliferation of the connective tissue nuclei and increased nutritive activity of the protoplasm in these canals and in the canaliculi of the bone. As the inflammatory process extends, leading to rarefaction of the bone and destruction of the osseous lamellæ, the embryonic and granulation tissues forming on the surface of the medulla and in the Haversian canals advances and occupies the lacunæ formed in the rarefying portions of the bone. As the lamellæ of the bone are destroyed, the cells of the bone set free by the opening of the osseous corpuscles, gain access to the medullary cavities and Haversian canals, exhibit increased nutritive activity, and augment the new tissue forming therein.

Whilst the above histological phenomena are taking place in the soft corpuscular constituents of the damaged bone, the compact osseous substance, as already mentioned, undergoes rarefaction. It becomes spongy, friable, and vascular. The Haversian canals which have been exposed by the fracture, as well as those in the vicinity, widen, communicate with each other, become confluent, and ultimately form irregular spaces of various dimensions, in which embryonic tissue grows rapidly. When commencing, the widening of the Haversian canals is very uneven, the dilated canals being of very unequal width and the sides presenting irregular prominences and depressions. In some instances, the prominent points appear to coincide with the presence of projecting closed bone-corpuscles; but in many places these corpuscles are evidently open—the previously contained bone-cells having disappeared.

The medullary cavities also enlarge, although more slowly; they become more irregular in outline by the junction of spaces formed by the coalescence of enlarged Haversian canals. If the inflammatory process be not very intense in action, nor very rapid in course, some of the canaliculi of the bone widen, and by means of enlarging and coalescing bone corpuscles form passages of irregular width, which divide into branches anastomosing with each other and communicating with the medullary cavities. During this enlargement of the medullary cavities and of the Haversian canals the osseous lamellæ are steadily undergoing removal—the edges of the treberculæ presenting the appearance of being eaten or gnawed away, and forming very irregular-sized, sharply-defined, and deep notches, which are occupied by large osteoclastic cells and embryonic or granulation tissue. The blood-vessels in the enlarged and united Haversian canals, as well as of the medulla, form new capillaries in the shape

of loops, which, with the embryonic elements undergoing proliferation, produce granulations.

This granulation tissue, springing from the medulla and penetrating the Haversian canals—from which it protrudes in exuberant growth—rapidly increases and covers the whole of the fractured surfaces. In many instances, this granulation tissue completely fills up the interstices between the splinters of bone, and in favourable cases unites the more deeply-seated fragments. These granulations formed in connection with wounded bone contain giant or myeloid cells in addition to the ordinary elements of granulation tissue.

In the embryonic and granulation tissue thus formed, ossification takes place—the new osseous spiculae always starting from old bone. They grow in every direction, inclosing irregular-shaped spaces filled with embryonic medullary tissue, and condensation takes place by the formation of fresh layers of osseous structure. The embryonic cells become angular, and are gradually surrounded by calcareous matter: some of these cells may be observed half enclosed in the new bone.

In some instances a very considerable but irregular production of new bone forms around the fragments in gun-shot fractures; and the open ends of stump bones, in amputations and other surgical operations, are closed in the same manner, the osteomyelitic action only progressing to the degree required for repair. During the late war I met with an instance in which new osseous formation was taking place around a piece of a ball lodged in the medullary canal of the tibia, the man died of secondary hæmorrhage, and the ball was found, *post-mortem*, surrounded by new osseous tissue, bony spicula joining each other around the ball, and apparently about to form an osseous case.

Suppurative Osteomyelitis.—In this condition, the inflammatory action in the osseous medullary tissue instead of proceeding to resolution in some parts, and the formation of new bone in other parts, not unfrequently proceeds on to the suppurative stage, pus being formed in the marrow, and this is the form in which osteomyelitis is usually first recognised clinically as a morbid process.

During the late war, gunshot fractures, owing either to the nature of the missiles or to the transport of the patients, were undoubtedly attended, in a most remarkable manner, by suppurative osteomyelitis—remarkable both as regards the extreme frequency with which it appeared, and the extensive form which the disease assumed. I am satisfied that the suppurative osteomyelitis among the splintered bones during the late war was much more common, much more extensive, and the suppuration more profuse, than occurred among the wounded received at Scutari in 1854, after the battles of Alma and Inkermann. When osteomyelitis runs on to the suppurative stage, the irritation becomes greater, the inflammatory action runs higher, and is more extensive among the medullary tissues. A number of small abscesses form in the indurated marrow. If death does not rapidly ensue from pyæmia, or some other cause, these abscesses may coalesce into one or more large irregular collections, and later still the medullary cavity may contain one large elongated purulent collection. This suppuration is not a separate form of disease from the red condensation of simple osteomyelitis, but is the second or advanced stage of the same inflammatory process. Embryonic cells are produced in considerable numbers and with great rapidity; the action runs on to the advanced form of diffuse suppurative inflammation, the cells, as they are rapidly formed, assuming all the characters of pus corpuscles. This retrograde process may be confined to the medulla of the divided extremities of the bone, or may occur in several distinct points of the medullary tissue, giving rise to separate abscesses, which rapidly communicate with each other by the extension of the suppurative process.

The early and copious production of pus is the essence of this disease, in which, indeed, purulent fluid is the sole inflammatory new formation. The capillaries do not throw out new loops, and the embryonic cells evince no tendency to the formation of granulation tissue, but as proliferation proceeds the new cells possess ill-formed, double or multiple nuclei, instead of each containing a well-defined, full-sized single nucleus. In suppurative osteomyelitis the bone does not become spongy or more friable, there being no absorption nor rarefaction of the osseous substance. The Haversian canals and medullary cavities do not enlarge or coalesce; the bone corpuscles are not opened, and

the osseous lamellæ do not present the appearance of being worm-eaten, or the sharply-curved lines of destruction observed in simple osteomyelitis. Of course if the latter affection had existed previous to the setting in of the more severe suppuration form, the portions of the osseous structure so affected will have undergone these changes to a greater or less extent. The purulent formation rapidly accumulates in the medullary canal, in the cancellous structure of the extremities of the long bones, and between the blood vessels and the walls of the Haversian canals. The whole marrow and soft constituents may suppurate. The presence of this pus interferes with the circulation and arrests the nourishment of the bone; and necrosis occurs either of several pieces of the bone at different points, or of the whole body of a long bone, the necrosed portions so killed presenting the aspect of bone that has been macerated, but not as if worm-eaten on the surface, like ordinary sequestra. In many instances osteophlebitis occurs, accompanied by the formation of thrombi, which may readily break up and be followed by multiple abscesses in the viscera or metastatic diffuse abscesses. The existence of venous thrombi in osteomyelitis is extremely difficult of verification, but they probably account for the connection which has been assumed to exist between pyæmia and the disease under consideration. If the coagula in the veins of the medulla or bone are friable or undergo purulent transformation, they may lead to pyæmia, and if they putrify they may cause septicæmia.

In a case of amputation, the end of the stump bone may be filled with pus to the extent of half an inch or more, and the remainder of the medullary tissue may be sound; or the osteomyelitic suppuration may extend through the whole length of the medullary cavity into the joint, and in some instances thence into another bone. I saw a case of osteomyelitis of the tibia in which the disease extended into the knee-joint, thence into the condyles of the femur, and on *post-mortem* examination the medullary tissue throughout the entire femur, up to the great trochanter, was hepatized and studded with numerous abscesses. I saw also at Metz a case of gunshot injury of the lower jaw, in which osteomyelitis occurred, and the disease extended through the maxillary articulation to the temporal bone, followed by inflammation of the membranes of the brain.

Gangrenous Osteomyelitis.—This disease is sometimes connected with septicæmia, or it may be induced by very intense osteomyelitis, combined with equally intense periostitis; the marrow cells, under such circumstances, evincing a great tendency to necrosis. In these cases the necrotisation of the marrow is very extensive, occurs very suddenly, progresses very rapidly, and its limits are ill-defined. In most instances, however, the disease is of more limited extent, and is the result of a very high degree of simple traumatic inflammation of the medullary tissues, being accompanied by the other stages of osteomyelitis in the vicinity. In such cases gangrenous osteomyelitis occurs in small patches situated near the open extremities of divided bones, being rarely found at a distance from the open end. In bones broken by the needle-gun bullet, a gangrenous patch of the medullary tissue is sometimes found at a considerable distance from the seat of injury; but on examination a fissure or split in the bone is found to communicate with the gangrenous spot.

Traumatic Periostitis.—As regards the safety of the patient, lesions of the periosteum are of less importance than many other complications of gunshot injuries. Indeed most extensive and serious damage may be done to the periosteum without much danger to the patient; but in respect of the process of healing, and the cure of injuries of bone, the consideration of periosteal inflammation is of the utmost surgical importance.

Simple traumatic inflammation of periosteum is seldom observed, except as a process of repair leading to the formation of new bone, which may be either permanent or temporary. This simple osteogenetic periostitis is employed by nature in the union and cure of injuries of bone, and is being utilised by Langenbeck and his followers in the operative treatment of gunshot fractures, by detaching the broken osseous fragments from the adjacent periosteum; but as a suppurative disease of any serious importance, traumatic periostitis is of extremely rare occurrence, even in very severe gun-shot fractures. In my visits to the numerous hospitals of the German Army, I did not meet with a single instance of well-marked diffuse traumatic periostitis.

The dense white fibrous layer of the periosteum is closely applied to and intimately connected with the subjacent hard osseous tissue by means of the numerous vessels that pass from one structure to the other. This anatomical relationship is unfavourable for the reception of a direct injury.

In gun-shot injuries of bones, periosteal extravasations of blood, varying in extent and number, are found. These hæmorrhagic effusions may be very minute in size and extremely numerous in number, scattered over the osseous surface, and quite unconnected with the broken ends or fissures of the damaged bone; or the ecchymosis may be more extensive and diffuse, spreading over a considerable space on the surface of the bone. I fully concur with Neudecker, Pirogoff, and Lidell, that these periosteal extravasations of blood are due to the difference of vibration, induced by the stroke of the bullet, in the hard elastic bone and the more flexible periosteum. This explanation is applicable to the cases of numerous punctiform periosteal hæmorrhages; but probably another cause may contribute to the production of the more extensive diffuse ecchymoses—viz., violent and irregular contraction of muscular fibres inserted in the vicinity.

Sometimes these effusions give rise to inflammation which may run on to the formation of pus. Purulent collections thus formed are generally small in size and circumscribed, but occasionally they are more extensive, and lead to purulent infiltration of the connective tissue between the deeper muscles and amongst the deep-seated tendons and fasciæ.

In some instances, in which a bone is struck by a ball but not broken, osteogenetic periostitis—parostosis—may be set up locally. Dr. Becher, who was with the German armies at Orleans, mentions a case in which a ball struck the femur, was completely flattened, curved, and remained fixed against the surface of the shaft of the bone. At the *post-mortem* examination some time afterwards, the bullet, flattened like a coin, was found lying close to the bone, and surrounded by new bony formation—the surface of the bone beneath the flattened bullet not being in any way depressed or damaged.

Embryonic cells are produced with great rapidity, and in considerable quantities external to the periosteum, in the vicinity of the injury; these corpuscular elements infiltrate the layer of connective tissue on the periosteal aspect, the sheaths of blood-vessels or nerves, and the connective tissue between deep-seated fasciæ, or around the tendons and between the fasciculi of the muscles. Ossification may take place in this embryonic tissue—the normal textures, such as muscular fibres, undergoing fatty degeneration disappear.

APPENDIX No. VIII.

MEDICAL REPORT OF THE 1ST FIELD HOSPITAL, 4TH DIVISION
NORTHERN ARMY FOR THE AUTUMN MANŒUVRES, DURING
THE MONTHS OF AUGUST AND SEPTEMBER, 1872.

By Surgeon G. A. HUTTON, Rifle Brigade.

1. AN Army Corps, after order of the 24th August, 1872, placed me in medical charge of the 1st Field Hospital, 4th Division of the Northern Army.

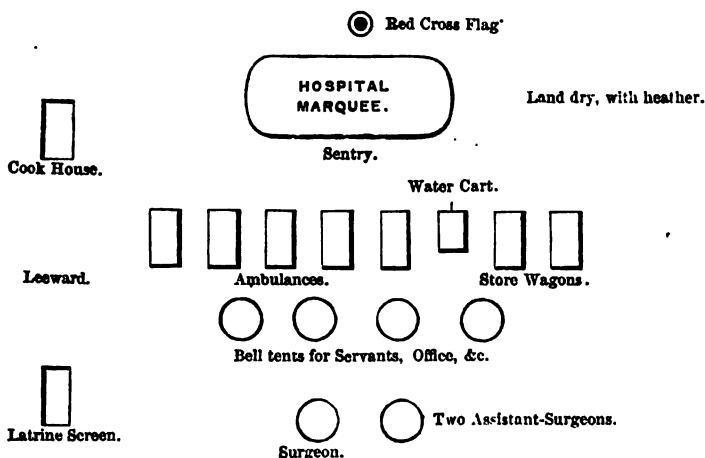
2. On the following morning I reported myself to Surgeon-Major Franklyn, Royal Horse Artillery, and Principal Medical Officer of the 4th Division at the South Camp, Aldershot, and ascertained that the stores, medicines, &c., had been drawn, and the field hospital, ambulances, &c., were all packed, and ready to move off with the division.

3. The constitution of the field hospital at this period was as follows :— 2 store wagons, with 4 horses in each ; 1 water cart ; 5 ambulances ; 1 pack mule. There were 2 hospital marquees ; 2 ridge-pole tents ; 6 bell tents, with other detailed stores, not necessary to be here enumerated.

4. The hospital staff consisted of Surgeon G. A. Hutton, Rifle Brigade, in medical charge ; Staff Assistant-Surgeon Grant, and Assistant-Surgeon Malcolm, 9th Lancers ; Serjeant Charles Smith, Wardmaster and Compounder of Medicines from Netley ; Assistant-Corporal T. Tubb, Assistant-Wardmaster, and 8 orderlies ; Colour-Serjeant Tavener, Steward ; Serjeant Gray, Chief Cook, and two Assistant-Cooks from the Control Department.

5. *August 26th.* The field hospital marched with the division this morning from Aldershot at about 6:30 A.M. Rain fell very heavily at the time, and continued for two hours, when the weather cleared up and was cool and fine. The division arrived at Hazeley Heath at 10:30 A.M. After receiving the instructions of the Brigade-Major the hospital was placed immediately in rear of the 1st Brigade. One marquee was pitched with the bell tents for officers, servants, &c. A sentry was applied for and placed over the stores and hospital. Before the marquee could be finished for the reception of sick, a man of the 9th Lancers was brought in an ambulance with fracture of the left external malleolus of the leg, and a severe injury to the upper jaw, caused by his master's horse running away whilst he was taking it to water, and rolling over him. One man of the 102nd Regiment was admitted with a swelling in the popliteal space, and in the evening a corporal of the Royal Horse Artillery with bronchitis. Nominal returns and medical certificates were sent with these men.

The following was the plan of the field hospital at Hazeley Heath :—



6. One of the ambulances was sent by order of the Principal Medical Officer of the division for the use of the Cavalry Brigade.

7. The proper position of the field hospital on the line of march was only determined to day, and placed in Divisional Orders. The wagons, &c., to follow immediately in rear of the baggage of the General Officer Commanding the Brigade, and in front of all the regimental baggage.

8. *August 27th.* As the hospital marquee takes sometime in striking, had to commence doing so at 4 A.M. Marched with the division from Hazeley Heath about 6:30 A.M., and arrived at Silchester at 10:30. The man of the 9th Lancers with fracture was sent to Aldershot before leaving camp. The field hospital was placed in rear of the brigade and in the same form as yesterday, but no marquee was put up,—the Brigade Major's instructions being received as to the ground occupied; land dry and heather. One man of the 102nd Regiment admitted with bronchitis; another man of the same regiment sent with pain in the shoulder, but as it was of slight and temporary nature, he was returned for treatment in the bell tent of his regiment. Had a parade of the non-commissioned officers and orderlies of the hospital at 4 in the afternoon, and addressed a few words of advice and instruction to them. The weather was fine and cool.

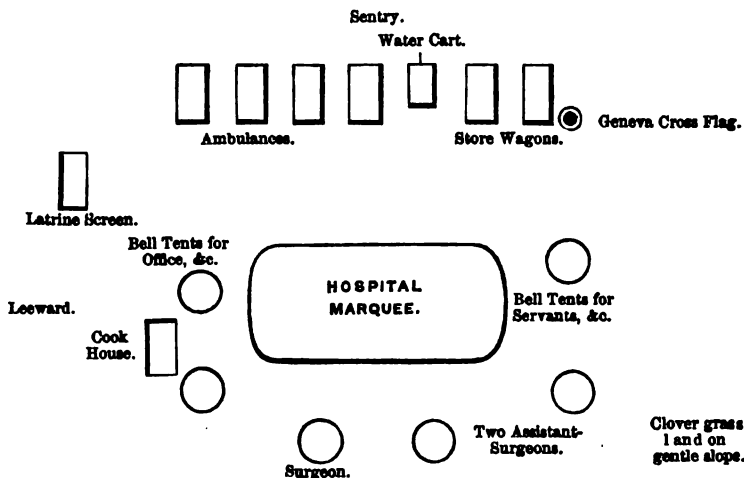
9. *August 28th.* As no marquee had been pitched we did not commence to strike tents until 5:15 A.M. Marched with the division at 6:30 A.M. The baggage wagon of the General of the 1st Brigade mistook the road at a crossing and was cut off from the column. The hospital wagons, immediately following, were also thrown out of the way, the result was we had to travel over a bad and hilly road. Arrived, however, at the camping ground at Greenham Heath, near Newbury, very soon after the brigade (about 11 A.M.) As soon as the Brigade Major's instructions were received the hospital camp was pitched on heather land and dry. No marquee was put up. Considerable difficulty about the rations for the man of the Royal Horse Artillery in hospital with bronchitis. Sent letter about it to the officer commanding his battery. Was obliged to order him extras. Weather cool and fine.

10. *August 29th.* Camp, Greenham Heath. The division halted for the day. No rations having been sent from his battery for the man of the Royal Horse Artillery, alluded to in yesterday's remarks, I represented the subject to the Principal Medical Officer of the division, enclosing copy of letter to officer commanding. Gave the man extras. A man of the 9th Lancers admitted with a bad sprain of the back. Four men of the 46th Regiment admitted. One man of the 102nd Regiment treated for cut head and bruised arm at 10 P.M., but returned to his regiment for treatment after the wound had been dressed. Weather fine and cool throughout the day.

11. *August 30th.* Previous to starting from Greenham Heath six men were sent by ambulance to Newbury for conveyance by rail to Aldershot for further

medical treatment. Marched at 6.30 A.M. Morning dull and cool. Shortly afterwards rain began to fall and continued to increase until about 4 in the afternoon, when it cleared up. The roads became very muddy. Arrived at Inkpen at 10 A.M., where the division halted for refreshment. Started again about noon, and arrived at Little Bedwin at 3 P.M. Received instructions about ground and at once pitched hospital camp on fine high grass-land. No marquee was requisite, as there were only two patients under treatment.

12. *August 31st.* Dull morning. Marched with the division at 6.30. Just before starting a man of the 102nd Regiment required the use of the catheter for retention of urine. Has been sent to hospital during the night, and the water then withdrawn. Much inconvenience and delay was occasioned by the horses for the field hospital not being sent by the Control Department in proper time, and we had to start with only two horses in one of the heavy store wagons—a number quite inadequate, at least, of the stamp of horses furnished for these manoeuvres. Marched over Waxcombe Down, where the division halted for refreshment, then through Collingbourne to Everley, and shortly afterwards it commenced to rain very heavily, wetting the men through, and continued so until some time after our arrival at our destination, Upavon, about 2.30 P.M. A delay of an hour and a half in getting on to the camping ground took place, by a canteen wagon of the 4th Regiment becoming fixed against a mud bank and requiring to be dug out. During this time rain fell very heavily and making the ground very muddy. The men's tents of the brigade were pitched on a stubble field. The hospital on clover-grass—both places very retentive of moisture, and consequently very muddy. As we had to be here for two days (over Sunday) a marquee was put up, the form of the hospital camp, which was on a gentle slope, being as follows:—



The form of the hospital camp had to be modified to suit the size and position of the ground.

Two men of the 102nd Regiment admitted in the evening—one with dysentery, the other with neuralgia. The man of the same regiment with retention of urine very unwell, requiring constant warm fomentation and the use of the catheter. The weather fairied about 4.30 P.M. but the evening was damp, raw, and cold.

The 2nd Royal Middlesex Militia Regiment joined the 1st Brigade, having come by railway to Pewsey, distant three miles from the camp at Upavon.

13. *September 1st.* Camp, Upavon. Sent the Weekly Sick Return in duplicate to the Principal Medical Officer of Division. Sent letter to Assistant Controller of Division about horses for the field hospital. New pattern A and B steel canteens taken into use. These would have been used before only the wrong keys had been sent, and they could not be opened. A man of the

2nd Middlesex Militia admitted with inguinal hernia, occasioned by a sprain on the line of march yesterday from Pewsey to the Camp. It commenced to rain about 11:30 A.M. and continued the whole afternoon and evening, only clearing up at 9 P.M. It was very raw and cold. Some of the regiments and staff officers had been able, to procure straw, which was very necessary and essential to health during such bad and wet weather.

It was settled to day that the hospital steward had to draw the field rations for the sick in the field hospitals, an arrangement that ought to have been made and clearly defined by the committee who laid down the rules for the guidance of the officers of the Control during these manœuvres, more especially when it was recommended by Dr. Lawson, Inspector-General of Hospitals, after the experience of the manœuvres of 1871.

14. *September 2nd.* Camp, Upavon. Signed the diet sheet to end of August. General Maxwell visited the hospital at 11 A.M.. A man of the 46th Regiment admitted with dysentery. Sent a field companion and water-bottle to 3rd Provisional Battalion of Rifle Volunteers, attached to the 3rd Brigade, obtaining receipt for same. Sent one ambulance for the use of the 2nd Middlesex Militia Regiment, and one to the 2nd Field Hospital, in accordance with instructions from Principal Medical Officer of Division. Received a Departmental Order at 7 P.M. to hold 1st Field Hospital in readiness to move at a "moment's" notice, marked "Confidential." At 10 P.M. got an order to send all sick not likely to recover soon to Pewsey, for conveyance to Aldershot at 6:30 in the morning. Day, cool and fine. Assistant-Surgeon Malcolm, 9th Lancers, left the field hospital to take medical charge of the Head-quarter Staff of the division.

15. *September 3rd.* Camp, Upavon. The sick, seven in number, including one Militia, sent off to Pewsey at 8:30 A.M. They ought to have gone at 6:30 A.M. but were detained in consequence of no horses having been sent by the Control Department until 8:30. Sent the Assistant-Wardmaster, Acting-Corporal Tubb, to hand them over to the medical officer proceeding to Aldershot. Struck the hospital marquee as soon as the sick had gone, so as to be ready for a quick move in accordance with last night's order. A man of the Royal Artillery admitted with colic. Received an order at 2 P.M. to detach a portion of the field hospital under Staff Assistant-Surgeon Grant to the Cavalry Brigade. Dr. Fraser, C.B. visited the hospital. Dr. Grant left at 6 P.M., taking with him Serjeant Gray, the cook, as his hospital steward, Corporal Tubb, as wardmaster, and Private Johnson, Army Hospital Corps, and Private Greenside, 18th Hussars, as orderlies.

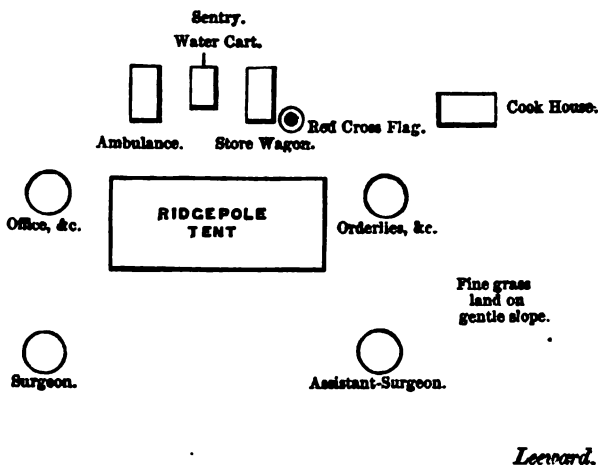
One store wagon with a proportion of equipment, including one hospital marquee, and one bell tent, and one ambulance.

At 8 P.M. an order came to General Maxwell, Commanding the 1st Brigade, to hold 1st Field Hospital in readiness to be detached from the division at short notice. The patient of Royal Artillery with colic was therefore handed over to the 2nd Field Hospital, and everything arranged for a hurried move. Assistant-Surgeon Lowe, of the 102nd Regiment, attached to the 2nd Field Hospital, who had been detached for duty, vice Assistant-Surgeon Grant, directed to join at once. The weather was fine and cool, with some rain in the morning, but only for a short time.

16. *September 4th.* Very heavy rain and violent thunderstorm with much wind about 2 A.M. Marched with the division at 7 A.M. from Upavon. Arrived at Amesbury at 11:30. Halted to enable the men to have refreshment, bread, cheese, and ale. Our store wagon was much too heavy for the two horses, the leaders having been taken away. Marched from Amesbury about 1 P.M. over Stonehenge Down, and arrived at Winterbourn Stoke at 3 P.M. Took up ground from the Brigade-Major in rear of the brigade, on fine grass-land on a gentle slope. Pitched a ridge-pole tent instead of a marquee. The dinners were somewhat late, and I had to find fault with the steward and cook. A man of the Royal Artillery admitted with primary syphilis, and one man of the 102nd Regiment with dysentery.

The form of the camp was as follows :—

ARMY MEDICAL DEPARTMENT.



Latrine
Screen.

17. *September 5th.* Camp, Winterbourn Stoke. Received order to hand into store the remaining hospital marquee, and to give one of the ridge-pole tents to the 2nd Field Hospital, 4th Division. Reported Serjeant Tavener, the Steward and the Cook for the dinners being so late yesterday to Mr. Forrest, the Control Officer in charge of the hospital stores. Captain Webb, the Commissary of Transport, called, and I impressed upon him the necessity for four horses of the weak stamp accompanying these manœuvres in the hospital store wagons. Major-General Maxwell, C.B., Dr. Fraser, C.B., Dr. Franklyn, Assistant-Surgeon Moffitt and Mr. Saville from Netley visited the hospital during the day. As we were now in sight of the pickets of the enemy, and not far from the River Wiley, everything was arranged with the hospital for rapid movements. One man of the Middlesex Militia was admitted with epilepsy. Three patients were sent in the evening at 6:30 P.M., on the orders of the Principal Medical Officer, by ambulance to the dépôt at Amesbury, *en route* to Aldershot, for further medical treatment, and immediately after their departure the ridge-pole tent was struck (time taken in doing this, 15 minutes—six hospital orderlies employed). At 7:30 the three patients returned, together with six other patients from the other field hospitals of the division, with orders for me to take charge of them for the night, as the Adjutant-General had decided to send them to Salisbury early in the morning. The ridge-pole tent was therefore pitched again (time taken in doing this 18 minutes). There were some slight showers of rain in the morning, but the weather was clear, with a brisk wind, and rather cold.

18. *September 6th.* Camp, Winterbourn Stoke. The nine sick taken into hospital last night were sent away at 6:30 A.M. by ambulances to Salisbury, for conveyance by rail to Aldershot. The division marched at 7:30 A.M. for the banks of the River Wiley. Struck tents and packed hospital baggage with the other baggage of the brigade, and waited orders. Remained in this way until the return of the division from the field at 4:30 P.M. Pitched camp again on the same ground. Bell tents alone put up, so as to be ready for quick movement. One man of the Middlesex Militia admitted with colic and vomiting. A man of the 49th Middlesex Volunteers, 1164 Private J. Pedrick, admitted in a very weak state from diarrhoea, had fallen out on the road and was picked up by the 2nd Middlesex Militia Regiment, and brought to hospital. Some beef tea was given, and he was made warm and comfortable in the tent. It rained heavily at intervals during the day, with high wind.

19. *September 7th.* Camp, Winterbourn Stoke. Struck tents in accordance with orders at 7 A.M., and soon after doing so, received orders to remain on the

same ground until the return of the division from the field, which took place about 4 P.M. Put up the ridge-pole tent. The Volunteer who was admitted yesterday was taken away by the surgeon and another officer of his corps, with the view of being sent home. Three men of the 46th Regiment admitted in the evening, one with febricula, the other with rheumatism. One man of the Middlesex Militia admitted at 10 P.M. with fracture of the metacarpal bone caused by falling over a tent rope. Weekly states in duplicate for Regular Forces and Militia sent to the Principal Medical Officer of Division. Weather fine and cool during the day.

20. *September 8th.* Camp, Winterbourn Stoke. Paraded orderlies at 10 A.M., and had them marched with the 46th Regiment, to which they were attached for discipline, to Church service, leaving the wardmaster and one orderly in charge of the hospital, in which there were five sick men. Three men of the Middlesex Militia admitted, one with contusion of the leg, the other two with rheumatism. One of the patients (the 46th Regiment) admitted yesterday with rheumatism, very unwell at night. Severe pain in the back and requiring turpentine stupes and hot fomentations. The weather was fine and cool during the day.

21. *September 9th.* Camp, Winterbourn Stoke. The division went out at 7 A.M. The field hospital remained in tact, and the orderlies and patients had their dinners at noon; then tents were struck, and we marched at 1.45 P.M. over Stonehenge Down, through Amesbury to Durrington, which was reached at 4.30 P.M. The corps d'armée, after an engagement, retreated on this place. It commenced to rain about 9 A.M., and the afternoon was very wet. Received the instructions of the Brigade Major, and soon had our hospital camp pitched, which was on a stubble field. The evening was very damp and wet. The man with rheumatism, mentioned in yesterday's report, still suffering much pain.

22. *September 10th.* Camp, Durrington. The division went out at 7 A.M. The camp and field hospital remained in tact. Dr. Franklyn visited the hospital. The division returned about 2 P.M. A man of the Middlesex Militia came with retention of urine, and about two quarts of water were withdrawn by the catheter. Two men of the Royal Engineers admitted, both with contused feet.

To-day the manœuvres proper terminated, and both southern and northern armies camped near to each other. The weather was cloudy, with occasional showers of rain.

23. *September 11th.* Camp, Durrington. One man of the 46th Regiment, with rheumatism, discharged to duty. A man (Serjeant-Major) of the Army Service Corps admitted with erysipelas of the face. Recommended that the tent he was located in at the time of attack should be cleared of all other men, and that it be given up to him, and pitched in the hospital lines. This was at once done. He brought also his own bedding.

Staff Assistant-Surgeon Grant re-joined the field hospital with the store wagon, ambulance, &c., which he took with him when detached for duty as a supplementary field hospital for the Cavalry Brigade at Upavon on the 3rd September. Six patients came with his ambulance, and were taken into hospital.

The division rested for the day, to clean up ready for the march past at Beacon Hill on the morrow.

The weather was tolerably fine, but there was rain at intervals during the day.

24. *September 12th.* Camp, Durrington. Eleven patients of the Regular Forces were sent to Aldershot, and five of the 2nd Middlesex Militia to the head-quarters of their corps at Barnet, this morning at 9 A.M.

The march past of the whole force took place to-day at Beacon Hill. The weather was very fine. No sick were admitted to hospital.

25. *September 13th.* Camp, Durrington. Instructions received about the medical arrangements for the return of the force to Aldershot. Had a parade of non-commissioned officers and orderlies of the hospital at 2.30 P.M. At 3 P.M. received order from Controller Hozier, by order of General Commanding, to give up all carriages belonging to the Army Service Corps. The water-cart was at once taken away; and as none was sent in in its place at 7 P.M., I requested that as the 1st Field Hospital was the only hospital open for the

reception of sick for the left column (comprising four Infantry regiments, Cavalry, Royal Artillery, Royal Engineers, &c.), and as there were patients in the hospital, and more likely to be received, a water-cart should be at once supplied, and in about an hour my request was complied with. Three patients admitted: one of the 46th Regiment, with conjunctivitis; one of the 13th Hussars, with abscess; and one of the Royal Artillery, transferred from the 2nd Field Hospital, with contusion. Assistant-Surgeon Lowe, 102nd Regiment, who had been temporarily attached to the field hospital, joined his corps. The weather was fine during the day.

26. *September 14th.* Camp, Durrington. The left column commenced its return march to Aldershot at 7 A.M. Sent weekly sick returns in duplicate for Regular Forces and Militia to Principal Medical Officer of Division. Was obliged to hand over the medical charge of the field hospital this morning to Staff Assistant-Surgeon Grant, as I was so unwell as to be obliged to travel in an ambulance, and, on Dr. Franklyn's solicitation and recommendation, be sent home from Pewsey for medical treatment.

SUGGESTIONS.

Preface to Suggestions.

The field hospital should be made as complete in itself as possible and in every particular, consistent with proper discipline and good order, and in relation to the General Officer Commanding and the Principal Medical Officer. For this purpose the following suggestions are offered, the result of practical experience during the manœuvres of 1872.

1. The rations for the sick in the field hospitals should invariably be drawn direct from the issuer by the Hospital Steward. It was laid down in the rules made at the War Office for the guidance of the officers of the Control Department during the manœuvres, that the sick should be included and returned on the regimental field ration return. As the field hospitals were common to the whole division, men were frequently admitted whose corps were located a considerable distance off, and much vexatious inconvenience and detriment to the sick was experienced at the commencement of the march by some of the patients not obtaining their rations. This was more to be regretted, as Dr. Lawson, Inspector-General of Hospitals, and a very able officer, made a distinct suggestion on this head after the manœuvres of 1871. It is to be hoped that a system by which an error so *grave* as want of food for the sick may not be overlooked on future occasions.

The fresh meat during the whole time was excellent, and all the other articles composing the ration were good, with the exception of the bread. This was heavy, and there must have been some error either in the yeast used or in the manner of baking; and it is very desirable that strict inquiry and observation should be made by the Control Department into this subject. Salt meat was issued on two days during the period to the hospital. It was of fair quality, and the men apparently liked the change.

Cheese was occasionally served out on the march, and was much liked by the men, but it would be a difficult article of food to supply in any quantity on active service.

No other article of food, such as Australian beef, sausage, or soup and bouilli, were served out, and I think this was wise. It is only advisable to issue such articles on active service, and in such positions where none other can be procured. English soldiers will never be satisfied otherwise, and it is indiscreet to attempt it; and when they have shown such alacrity, industry, and readiness for hard work, under the trying circumstances of bad weather, as during these manœuvres, it is well their wishes in so important an article as food should be consulted. Perhaps the same remarks may not apply to Australian beef, but that at present is only an experiment, and sufficient experience has not yet been obtained to offer any definite opinion upon its value in the field. For my part I would not recommend it, except under circumstances of difficulty in procuring fresh meat.

The scale of diet, as follows, was excellent, and all that could be desired :—

Ordinary rations: 1 lb. bread, or 1 lb. biscuit; 1 lb. meat, fresh or salt. Extra issue: $\frac{1}{2}$ lb. cheese, when deemed necessary, and ordered by officers commanding divisions for men on outlying pickets, and in situations where difficulties exist in issuing the ordinary ration. Groceries: $\frac{1}{2}$ lb. bread; $\frac{1}{2}$ oz. tea; 2 ozs. sugar; $\frac{1}{2}$ oz. salt; $\frac{1}{4}$ oz. pepper.

2. The horses for the field hospital should be located near to it, in the same way as the regimental transport horses. Much unnecessary delay and inconvenience were experienced on some occasions by the horses being taken away to a distance of some two or three miles, and kept till again required.

3. The ambulances set apart for the use of regiments (one to each corps) ought to form part of the regimental transport, and be parked with the regimental baggage-wagons. They ought only to be removable when the regiments occupy a standing camp, or in other extraordinary emergencies, when, if not required for the time being, they should be placed at the disposal of the Medical Department, the Principal Medical Officer sending a requisition for the same to the officer commanding the regiment. The same authority, indeed, should be exercised on these occasions, by the Medical Department, as the Control Department have over the regimental transport under similar circumstances. (See page 3 of the Special Regulations issued by the Quartermaster-General's Department in London, for the autumn manœuvres 1872.)

4. For field hospitals that are required to move at "short notice," or at a "moment's notice," I would not advise the hospital marquee as an article of equipment. The ridge-pole tent is all that is required. These tents are easily and quickly pitched and struck, require no fatigue party from a regiment to assist, are capacious and comfortable, more easily carried, and altogether better adapted than the hospital marquee, where quick movements are daily to be expected. Depot stations—such, for instance, as in these manœuvres of 1872—at Pewsey and Amesbury should be furnished with marquees; but with the moving force I consider they can be dispensed with without any detriment to the sick.

The ridge-pole tent, with six hospital orderlies, can be pitched in *eighteen* minutes, and struck in *fifteen* minutes.

A certain proportion of hospital marquees might be stored at the depot stations in the event of being required at any point during the manœuvres.

5. The various hospital stores, equipment, &c., should be enumerated, and painted in distinct letters on the hospital store wagons; and it would be desirable that the hospital equipment on the one wagon should be exactly the counterpart of those on the second wagon: thus in the event of detaching part of the hospital for the exigencies of the service—say during the night, as in the midnight march of the Cavalry Brigade from Upavon to the River Wiley—no packing and unpacking of the wagons would be required. By proper forethought on the part of practical medical and military men, these details might easily, in my opinion, be arranged by the next manœuvres.

6. A recognized place in the baggage train, on the line of march, for the field hospitals should be published in the Special Standing Orders for these manœuvres. This had to be done on this occasion, after the division marched from Aldershot, the place assigned being immediately in rear of the baggage of the General Commanding the brigade, and in front of all the regimental baggage, and this position I would recommend in future. It is essential that the field hospital should be well up with the force. For instance, a man of the 9th Lancers was severely injured towards the end of the first day's march, and required prompt treatment in a field hospital. This I was enabled to render from being well up with the force. On active service how much more necessary to be in a position where medical assistance could easily and promptly be rendered.

7. The red lamp set apart as a distinguishing mark for the field hospital at night should not be permitted to be used by any other corps or department in the camp. Red lamps were permitted for other than hospital marks during these manœuvres; and it is suggested that green, blue, or white may be issued for other branches of the service other than hospitals.

8. As some canteen carts and tents had white flags with large red letters or red devices marked thereon, simulating the Geneva cross flag, it is suggested that flags of this description should not be permitted. All distinguishing flags

and lamps should be inspected by a competent officer prior to the force taking the field for the manœuvres.

9. No direct order, such as emanated from the War Office, forbidding the issue of straw for soldiers' bedding should be issued in future. Straw for such purposes should be discretionary on the General Officer, and on medical recommendation. The weather during the past manœuvres was, on several occasions very wet and cold, and straw was very necessary when it could be procured. It is hoped that the order for the non-issue of straw may, on future occasions, be *modified*, so as to suit the exigencies of the season.

10. A small pocket aneroid barometer should be allowed for the office of the Principal Medical Officer, either of the Corps d'Armée, or for the offices of the Principal Medical Officers of Divisions.

11. The new pattern A and B steel canteens answered well. The cooking was carried on in this apparatus in a most satisfactory manner. They are qualified to stand wear and tear well, and are very convenient. I would advise these canteens to be used on all future occasions.

12. The two leading horses of the store wagons were taken away some days after leaving Aldershot, and I have no hesitation in saying, after *large experience of horses* and their capabilities, the wagons were underhorses. The difficulty entailed in getting the wagons to their daily destination on some occasions was very great indeed, and I had to borrow assistance from other sources. I noticed a suggestion in one of the London daily papers during the manœuvres, that an agent of the Royal Humane Society should be present, and I certainly was not surprised at it. I made several remonstrances about the two horses being taken away, but without any effect. I would strongly advise the Secretary of State for War to obtain the opinion of practical military men who are well versed in horses, in fact practical horsemen, and by all means not to leave this most important subject to the decision of the Control Department. Two horses, such as are employed by the great carrier firms of England, may be sufficient for these store wagons; but most assuredly not two horses of the weak, physical condition as those used during these manœuvres.

13. No hand or cross-cut saw, nor any reaping hooks were sent with 1st Field Hospital equipment. It would be advisable on future occasions to have a hand saw, and a small number of reaping hooks.

14. The pack animal was of very little use. There was always some difficulty and delay in adjusting the panniers, and after a few days the animal was so galled as to be laid up, and was not used again during the manœuvres. A small medicine cart, properly fitted, would be, perhaps, preferable; indeed for active service, or for these manœuvres, the whole system of medicines, and medical equipment, requires careful consideration and supervision. This appears to me to require early attention.

15. I regret to have to report, with not much favour, on the men of the Army Hospital Corps, attached to 1st Field Hospital generally. With the exception of the wardmaster, Serjeant Smith, who performed his duty well, there was for the most part a disregard for cleanliness, industry, and honest work, that was very painful to witness, and contrasted unfavourably with the duty soldier, who with ready cheerfulness, endured long marches, constant hard work, and much discomfort from bad and wet weather.

It was only after having parades, and giving them clearly to understand that any unsoldierlike conduct would work to their disadvantage, that order was preserved and maintained.

16. I cannot omit to mention the uniform courtesy and attention on all subjects connected with the hospital equipment, &c., I received from Mr. Forrest, the Control Officer in charge of the hospital stores, &c. An officer of this description is of the greatest possible utility to the Medical Officer in charge of a field hospital, as it relieves him in great measure of many matters of detail in regard to stores, food, &c., and moreover keeps his head and hands clear for the more important work of medical supervision and superintendence, and care of the sick.

17. In concluding these suggestions, one thing I am thoroughly convinced, that a Medical Officer to have charge of a field hospital should have energy, zeal, and good physical health. He should, if possible, be a good horseman. He

must be prepared to meet many difficulties and contingencies that must ever be incident to active service, *and even to autumn manœuvres*, and he must be prepared to meet them with becoming tact and judgment.

The two last paragraphs in Sir Thomas Watson's admirable introductory lecture to his "*Principles and Practice of Medicine*" should be ever fresh in his memory, for they contain words that deserve to be written in letters of gold in the minds of all medical men.

Hints for Medical Officers in charge of Field Hospitals.—The result of experience during the Autumn Manœuvres of 1872.

1. Always carry a spare set of horse shoes. Examine your horses' shoes each morning before marching, or better at the end of the day's march. A lost shoe may be a source of great annoyance, and delay considerably your movements; and a Medical Officer in charge of a field hospital can ill-afford to be absent from his charge on the line of march, if he wishes all to go on well.

2. A waterproof bag, attached by straps to the side of the saddle, will be found most useful. A good field glass is also a very useful article of equipment, and may be carried with other things in this bag.

3. Always take a waterproof cover for your horse.

4. Examine the water cart, and see that it contains water before marching. Examine the water barrel of every ambulance before starting it on any duty, and ascertain that it contains water. There is nothing a wounded or injured man craves more for than water, and to be without it, when means are provided for storing it, is culpable negligence.

5. The latrine screens should be the last article of hospital equipment struck and packed in moving off from camp. Men frequently want to use these up to the last minute before marching, and they should therefore be left standing as long as consistent with due order and regularity in marching.

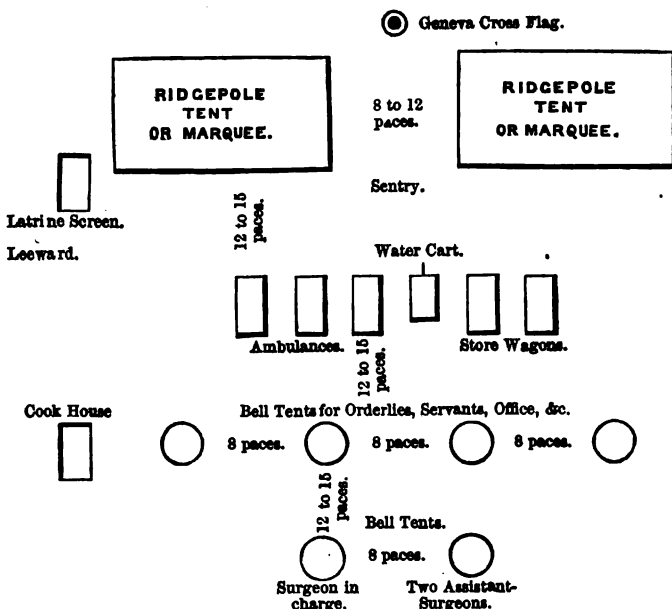
6. It is very advisable to have occasional parades of the hospital servants, to see that they are clean and regular, and have due regard to good order and discipline. It is also very necessary that as many as can be spared should attend church service on the Sunday. Only the number absolutely required for the sick should be exempt from *this very necessary parade*.

7. The reserve medicines and medical comforts should be occasionally inspected, to see that the supply is kept up properly for all the requirements of the sick.

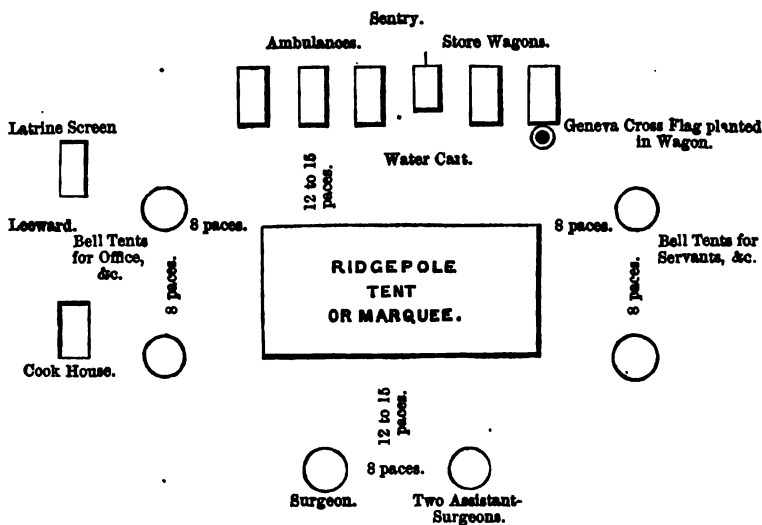
8. On arrival at the camping ground, get the Brigade Major's instructions as to the position of the field hospital. This officer has to arrange the ground for the various corps, &c., in the brigade, and it is very necessary his instructions should be sought before attempting to fix the hospital camp. The best position is in rear of the centre of the brigade; but much must always depend on the form and size of the ground occupied.

9. No decided rule can be laid down for the formation of a field hospital camp. In all details the Medical Officer will have to exercise a wise discretion in accordance with the form and size of the ground, and other contingencies. Examples of the hospital camp during the recent manœuvres are given in the accompanying report. The following general plans may be found useful.

No. 1. Plan of Field Hospital Camp.



No. 2 Plan.



10. Apply for a sentry over the hospital stores and hospital as soon as you arrive in camp, if one is not provided for you. The Brigade Major is the officer to be appealed to.

11. See that due order and proper discipline is maintained by the hospital staff and servants on the line of march. Allow no man to fall out without permission.

12. Examine the rations daily, and see that they are good. Take care that

when patients are sent away for further treatment that they have food before starting. Ascertain also that they have the remainder of their day's rations with them. Neither patients nor hospital servants should march without having tea and bread before starting. The Medical Officer should study the comfort and health of his men as much as possible.

13. The first thing to be done on arriving on the camping-ground is to arrange for the form of the hospital camp, and set the men to work to pitch tents; then see that the cooks get the kitchen prepared, and food cooked ready for patients and servants. Delay in this respect should never be permitted.

14. Disturb pasture and fine grass land as little as possible. A trench round the tents will rarely be found necessary on such ground.

15. See that trenches are properly filled in, and that offal, and pieces of paper, &c., are buried before leaving the camping-ground. Great attention should be paid to these details.

APPENDIX No. IX.

REMARKS UPON CASES SELECTED FROM THE RECORDS OF
THE MEDICAL DIVISION OF THE ROYAL VICTORIA HOSPITAL,
NETLEY, DURING THE YEAR 1871.

By W. J. FIFFE, M.D., Surgeon-Major, Assistant Professor of Medicine, Army Medical School.

BEFORE proceeding to detail the cases I have selected for observation, a few general remarks may be appropriate. 1,303 cases were admitted during the year; of these 319, or nearly one-fourth were from phthisis; from anæmia, 83; from affections of the liver, exclusive of abscess, 80; from rheumatism, 75; intermittent fever, 67; hypertrophy of the heart, 64; dysentery, 64; valvular disease of the heart, 61; bronchitis, 58; epilepsy, 26; locomotor ataxy, 18.

The above diseases form the *most prominent items* in the annual return.

PHTHISIS PULMONALIS.

The causes of the great prevalence of phthisis have been over and over again remarked upon. One point, however, seems worthy of notice on this subject, namely, that since the views of Niemeyer have been published, more attention has been drawn to those cases which were formerly regarded as resulting from the deposition of tubercle, but are now known to have had their origin in inflammation of lung tissue. In other words, we are becoming more alive to the fact that phthisis may follow as the direct result of catarrhal pneumonia, either acute or chronic, and *that* without the existence of that general depraved condition of the system known as tuberculosis.

The opening words of Professor Niemeyer, in his clinical lectures on pulmonary consumption, are well worthy of quotation. He says, "There is no subject in the whole range of pathology which more urgently requires a thorough reform than that of pulmonary consumption. In this field pathological anatomy is much in advance of clinical medicine. The term pulmonary tuberculosis being still the one most commonly used for pulmonary consumption, shows that the majority of physicians and clinical teachers of the day abide by Laennec's doctrine, and recognize but one form of pulmonary phthisis, namely, tubercular phthisis. The dangerous tenets of Laennec's doctrine, that pulmonary phthisis is a constitutional disease, that it never can develop itself out of acute, or chronic pneumonia, or take its rise from a bronchial hæmorrhage, or from a neglected, or protracted cold, are up to this day taught in the medical schools as undisputed truths, and have in practice a most pernicious effect on the prevention and treatment of phthisis."

The directly beneficial effect of a promulgation of Niemeyer's views leads to this practical result, that all inflammatory diseases of the lungs should be watched with the greatest care. That above all things an early diagnosis of the pathological changes arising in the lung is of the utmost value; that the thermometer, that sure indicator of pneumonic inflammation, should be the medical officer's constant companion, and that the treatment should be directed without delay to the arrest of inflammatory action, and to the removal of those products of inflammation which lead to disintegration and destruction of the lung tissue.

It is hardly necessary in the present state of knowledge on the subject of thermometry to urge upon the officers of our service the great importance of this subject, or to impress upon them the great value of the thermometer as a guide to the diagnosis and treatment of disease.

PHTHISIS PULMONALIS.

The following cases have been selected :—

Gunner J. M., aged 40, admitted to Netley Hospital on the 12th of May, 1871—died on the 22nd of May. The disease had existed for 54 days previous to admission.

The medical history sheet of this patient contains no entry of any admission to hospital for any chest affection previous to the 18th of February, 1871, when he was admitted with a severe cold, and remained under treatment until he was invalided home. On admission to Netley there was general emaciation—anaemia, with sunken orbits, voice hoarse and feeble, stethoscopic examination much interfered with, owing to his prostrate condition, crepitating rales were audible over the upper parts of both lungs, with dulness on percussion; he died from exhaustion.

Post-mortem Examination.—The pleura, covering the base of the left lung, and the portion of diaphragm in relation to it, greatly thickened. Left lung adherent posteriorly throughout the lower half of its extent to the lateral aspect of the chest. A cavity, containing fluid, situated between the left lung and wall of the chest. The upper portion riddled with cavities. Right lung on section shows pneumonic consolidation, with great friability of texture at the base. Upper lobe infiltrated with soft yellowish material, beginning to break up into cavities.

Mesenteric glands enlarged; tubercular deposit sparsely scattered over the valvulae conniventes.

Private W. L., 37th Regiment, aged 29.

In March 1870, after an attack of vomiting, was suddenly seized with pain about the right breast, great dyspnoea and cough, with the physical signs of pneumothorax; he remained under treatment for four months, and was finally invalided from India in October 1870.

On admission to Netley, May 5th, he was very much emaciated; had frequent distressing cough, with dyspnoea, complained of having dragging pain in the hepatic region, and inability to lie on the left side.

† Right side of chest bulged outwards; intercostal spaces widened and motionless. Hyper-resonance extending across mesial line, displacing the heart. This hyper-resonance existed also posteriorly in the scapular, and inter-scapular regions. Profuse perspiration, temperature 102. Died on the 6th June; the fluid in the pleura had slowly accumulated, while the hyper-resonance proportionately diminished.

Post-mortem Examination.—Right pleura completely distended with fluid; heart displaced to left side; right lung collapsed, and pressed backwards, and adherent to the diaphragm.

Left lung congested, showing on section a large amount of minute miliary growths. Two cavities at the lower part of the upper lobe. Nutmeg congestion of the liver.

Gunner T. C., aged 34; 18 years' service.

Invalided from Bengal. No hereditary history of phthisis; suffered from primary syphilis in 1859; most probably a soft non-infecting sore. On arrival in Netley was much reduced from persistent diarrhoea. Right apex very dull on percussion; respiratory murmur absent, occasional clicking sound at this point. Left apex also dull, never had hæmoptysis. Had a fistula in ano which was still discharging at the date of his admission.

This patient remained two months under treatment in Netley. The general symptoms—cough, expectoration, hectic and diarrhoea, were very severe, and he died from exhaustion on the 21st of June.

Both lungs were found irregularly consolidated; pleuritic adhesions existed over the posterior surface of apex, and base of right lung. There was catarrhal inflammation of the bronchial tubes towards the right base, terminating in a

gangrenous cavity, with ulceration of the larger bronchi. Pneumonic consolidation, with small cretaceous deposits, existed in the upper lobe of right lung. There were also extensive miliary deposits throughout this lung.

Left lung congested; lower lobe in a state of red hepatization. Heart flabby; liver enlarged and congested; evidences of old ulceration in large intestines.

In this case the deposition of miliary tubercle was most probably secondary to the pneumonic consolidation, and catarrhal inflammation of the tubes.

Private G. D., Army Hospital Corps, aged 35; 13 years' service. Admitted August 13th, 1871; died November 15th, 1871.

There was no hereditary history of phthisis in this case, and no special cause for the disease beyond constant succession of severe colds, followed by hæmoptysis. Phthisical symptoms were developed in six months after the first attack. After his admission to Netley he became gradually worse; suffered from diarrhoea, constant nausea, and partial aphonia. The first attack of catarrh was in April 1870. He died on the 15th December, 1871.

Post-mortem Examination.—Right lung collapses normally; left does not; pleuritic adhesions in both; right lung infiltrated in parts, with cheesy exudation. Catarrhal infiltration of air cells; gelatinous infiltration towards the base. Lobules near the base infiltrated as if injected with tallow; red and grey hepatization mixed in both lungs. Small cavities in the apex of left lung, with miliary tubercle infiltrated throughout its texture.

A small aneurism corresponding to the 4th dorsal vertebra was found in the aorta; the aneurism was about the size of a marble; numerous patches of atheroma were found in the aorta. The liver and spleen were found in a state of lardaceous degeneration, and the intestines were extensively ulcerated.

Private J. B., aged 29; admitted November 10th, 1871; died November 20th.

This patient was admitted from Rangoon in a state of great emaciation and exhaustion. There was no hereditary history of phthisis, and no special cause given for the original onset of the disease, beyond the usual symptoms of a severe cold in the chest from which the present condition was developed. There was dulness on the whole of the left chest; respiratory sounds absent at left apex; moist crepitation all over right chest; expectoration copious and purulent. This man died ten days after admission from exhaustion and hectic.

Post-mortem Examination.—Left lung adherent to costal pleura throughout; right lung in a state of pneumonic consolidation, with scattered cheesy deposits; several small cavities existed in the apex, and some smaller ones near the base; great enlargement of bronchial glands. Catarrhal congestion in small intestine.

There have been eight cases of aortic aneurism under treatment in the division during the year; of these three were cases affecting the thoracic aorta, and five the abdominal; one case of thoracic aneurism proved fatal.

The cases of thoracic aneurism were briefly as follows:—

Private W. L., aged 22; 3½ years' service; has had syphilis both primary and secondary.

State on admission: heart enlarged; impulse very strong; first sound prolonged at the base; bruit follows the course of the aorta. Right radial pulse scarcely perceptible; no difference in the pupils; discharged the service.

Private M. B., aged 38; 1st Battalion 13th Regiment; 16 years' service.

State on admission: well-marked secondary pulsation at right second intercostal space where there is a bulging tumor, with a strong impulse; but no bruit of any kind. Cause uncertain; no syphilitic history; discharged the service.

Private A. V., 45th Regiment; aged 43.

The history reports that the symptoms in this case came on suddenly, and were principally dyspnoea; sometimes amounting to orthopnoea, cough, and expectoration of frothy mucous. On admission to Netley the dyspnoea was very severe, and inspiration was attended with stridor. A few days after admission orthopnoea became constant. Later on the countenance became cyanotic. The left radial pulse stronger than the right. Suffered from severe

neuralgic pain in the right shoulder, and at the back of the right side of the head; veins of the neck distended. Pulsation of tumour visible at the second right intercostal space; but no bruit audible; complete aphonia came on a few days before death. Death caused from asphyxia.

Post-mortem Examination.—On removing the sternum, a tumour was found projecting forwards, which had pressed against the sternum, and partially eroded it, in fact the anterior wall of this sac was formed by the sternum.

The aneurism itself springs from the ascending portion of the arch, and involves the roots of the great vessels on the right side. The descending aorta marked by irregular dilations and patches of yellow deposit. Ulceration in the trachea, involving some of the rings; left lung cedematous, and partly hepatized; cardiac textures normal.

The cases of aneurism of the abdominal aorta were as follows:—

Private G. B., 1st Battalion 19th Regiment, aged 27. Had primary syphilis in 1870.

State on Admission.—Pain and dragging in the back, to the right of the spine, when recumbent; pulsation is visible to the right of the abdominal aorta, from the lower part of the epigastrium to about an inch and a half below the umbilicus; a soft tumour can be felt here, with a strong impulse; attributes the disease to over exertion. Discharged from the service.

Private H. S., 55th Regiment, aged 36.

State on Admission.—An aneurismal tumour exists in the epigastrium, to the left of the mesial line, accompanied by strong pulsation; a well-marked thrill is communicated to the hand when placed over the tumour, and there is a loud and distinct bruit. This patient has also aortic regurgitant disease; he has little or no pain, and only suffers from dyspnoea. Invalided.

Private F. M., 37th Regiment, aged 36.

State on Admission.—A large aneurismal tumour in the epigastrium, to the left of the aorta, pushing the liver over to the right side, accompanied by a loud bruit audible in the lumbar region; a distinct pulsation is communicated to the liver from the aneurism, which bulges out the ribs, and intercostal spaces on the right side at each arterial impulse. This patient has also well-marked regurgitant disease of the aortic valves. Discharged from the service.

Corporal J. C., R.A., aged 30.

State on Admission.—A small aneurismal tumour of abdominal aorta close to the umbilicus; very tender on pressure, and accompanied by a distinct murmur, and very severe lumbar neuralgia. Discharged from the service.

Private M. B., 61st Regiment, aged 36.

State on Admission.—Severe lumbar neuralgia; very strong pulsation below and to the right of umbilicus, attended with a loud prolonged murmur, but without any well-defined tumour; had primary syphilis in 1863. This was probably a case of simple dilatation of the aorta, with extensive atheromatous deposit. Discharged from the service.

Corporal T. D.

State on Admission.—A well-marked case of abdominal aneurism. The tumour is situated to the left of the linea alba, above the level of the umbilicus; tender on pressure; a loud bruit audible.

VALVE DISEASE OF HEART

Sixty-three cases of this disease have been recorded in the division during the year. Fifty-five were invalided, two died, one was discharged to duty, and four remained under treatment.

The cases are tabulated as follows, according to the seat of the murmurs indicating the valves affected:—

Mitral Obstruction (pre-systolic)	..	..	..	..	1
Mitral Regurgitation	..	..	..	..	18
Aortic Obstruction	..	..	..	..	12
„ Regurgitation	..	..	..	..	11
„ and Mitral disease combined	..	..	..	..	14
Obstruction and Regurgitation	..	..	..	..	7
Total	..	..	..	..	63

Of the cases of mitral regurgitation, the cardiac affection either resulted from or was complicated with the following diseases :—

With Anæmia	2
„ Acute Rheumatism	3
Hepatic Enlargement and Syphilis	1
Rheumatism and Syphilis	2
Syphilis alone	3
Pneumonia	1
Uncomplicated Cases	6
Total	18

Of 23 cases of aortic disease, there were 12 in which the murmur was obstructive, and regurgitant in 11. In the entire number there was a previous history of the following affections :—

Enlarged Spleen	1
Dysentery	2
Sciatica	1
Secondary Syphilis	8
Hypertrophy of Heart	1
Anæmia	1
General Debility	1
Rheumatism	4
Uncomplicated	4
Total	23

In 14 cases aortic and mitral disease were combined, evidenced by loud regurgitant murmur at the apex, and either obstructive or regurgitant aortic murmur at the base of the heart.

In these cases there was a previous history of the following diseases :—

Bronchitis	2
Syphilis and Enlarged Liver	1
Pneumonia and Syphilis	1
Hypertrophy of Heart	1
Acute Rheumatism	2
Syphilis alone	1
Uncomplicated	6
Total	14

The following cases of hepatic abscess were treated in the division during the year :—

Case of abscess of the liver, treated by puncture and free incision into the sac. Recovery.

Private M. M., aged 26, 6½ years' service, invalided from Kussowlie, had been 121 days under treatment in Lucknow, for typhoid fever and its consequences. During convalescence a large painful swelling appeared in the region of the liver, which rapidly suppurated. This abscess was punctured three or four times; a seton was then introduced, and finally a free incision was made into the cavity of the abscess. This incision remained open for four months, and then healed up. At the time of his discharge from Netley there was some slight pain over the region of the liver, and absence of breath sounds at the base of the right lung. In this case there was no previous history of dysentery.

Case of abscess of the liver, opened externally. Recovery.

Gunner H. F., aged 25, service 4 years, invalided from Agra. The abscess in this case followed an attack of inflammation of the liver in 1870. The abscess pointed through the intercostal spaces on the right side, and was opened. On admission to Netley there was a fistulous opening under the ninth

rib, from which a small quantity of matter oozed at intervals. The discharge was very trifling; general health good. Invalided. There was no history of dysentery in this case.

Case of abscess of liver, discharged through the right lung. Recovery.

Corporal A. P., aged 33, 13 years' service, invalided from Lucknow. Has had three attacks of acute hepatitis since August 1870. On arrival at Netley he was very anæmic, and suffering from malarial cachexia; spleen enlarged; liver also very much enlarged; hepatic dulness extends downwards for 10 inches below the nipple; on both sides of the chest the false ribs are pushed forward; the epigastrium hard and tender. Although fluctuations could not be detected between the false ribs on the right side, the symptoms led to the belief that an abscess existed. There were night sweats, high temperature, short dry cough, and rapid pulse. Two days after admission, and during a fit of coughing, he brought up a large quantity of purulent fluid, from $2\frac{1}{2}$ to 3 pints. The pus appeared healthy, and mixed with broken-down tissue. On the 7th March between 25 and 30 ounces of pus were coughed up. From that time forward the quantity gradually diminished, and on the 11th the cough and expectoration had ceased. General health improved rapidly, and he was discharged in a fair state of health, but unfit for further service.

Case of chronic dysentery and hepatic abscess. Death.

Corporal C. B., 59th Regiment, aged 37. Admitted to Netley Hospital on the 8th April, 1871. He had suffered from chronic dysentery at Indore since October 1870. A man of intemperate habits.

On admission he was in great suffering, and greatly emaciated; countenance very sallow; abdomen enlarged; cutaneous veins of abdomen very turgid; in the hepatic region a prominent mass could be felt, very tender on pressure; passed 10 motions in the 24 hours; motions very fetid, occasionally bloody, with scybale and flocculi of lymph. Fluctuation was detected in the liver a week after admission, and a trocar was introduced, and about 3 ounces of thick pus withdrawn. He expired suddenly two days after admission.

The following details are worthy of notice in the *post-mortem* examination:—

There was universal and firm adhesion of the pleura on the right side. The base of the right lung firmly adherent to the diaphragm, which at this situation was adherent to the upper convex surface of the liver, which bulges upwards. The pleura at this part is much thickened.

Liver very greatly enlarged; extends quite across the abdomen, and downwards below the ensiform cartilage; the upper margin of the right lobe extends to the lower border of the fourth rib; considerable thickening of the perihepatic membrane beneath the sternum and cartilages of the ribs; owing to dense adhesions there was great difficulty in removing the liver from the abdomen.

Right lobe especially enlarged; on the upper surface are three large cavities, situated in close proximity to each other, the largest cavity measuring 3·2 inches by 2·2 inches, and in depth 2 inches. The upper boundary of these cavities was formed by the diaphragm in a state of commencing disintegration, and by thickened and adherent pleura. One cavity tended to open into the base of the right lung, while the two other cavities tended to open into the right pleura, into which their contents escaped on removal. The contents of the abscesses were very thick pus, with shreds of disintegrating hepatic tissue; no inner lining to the cavities. There were two or three other smaller cavities in the right lobe. In addition to this there were three large abscesses in the left lobe, one of which tended to open into left pleura and pericardium. One of these abscesses was intimately connected with the pancreas and œsophageal end of the stomach by new and firm adhesions.

The cecum was the seat of active dysenteric ulceration; the whole of the mucous membrane was involved, and covered with diphtheritic exudation; the ulcers were irregular in shape, superficial, and surrounded by intense injection of the vessels. In the ascending portion of the colon there were cicatrices of old ulcers, and a few patches of recent ulceration.

Case of multiple abscess of the liver; communication between one of the abscesses and the right pleura. Death.

Corporal J. B., aged 23, 6 years' service, admitted to Netley, December 11,

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1870, in a very prostrate condition, suffering from dysentery, hepatic enlargement and tenderness, with dullness on percussion, in the lower third of right side of chest in front. An opening was made in the eighth intercostal space in front, and 35 ounces of purulent fluid were removed. Death took place on the 29th January, 1871, from exhaustion.

The *post-mortem* examination disclosed numerous small abscesses scattered throughout the substance of the liver; one about the size of a turkey's egg was found in the right lobe, communicating directly with the right pleura. The spleen was enlarged and indurated; extensive ulceration existed in the large intestine, especially in the rectum; the right pleura was full of pus. In this case no doubt a large proportion of the purulent fluid which was removed by the operation was produced from the cavity of the pleura, but in all probability the hepatic abscess was the primary cause of the empyema.

Case of hepatic abscess, discharged through the right lung. Partial recovery.

Private J. W., aged 32, 13th Foot, 15 years' service, was invalided from Nynee Tal for anæmia, the result of malarious fever. On admission to Netley there was bulging in the hepatic region, fulness of intercostal spaces, and tenderness. The abscess had penetrated into the right lung during the voyage home, and there was a copious discharge taking place through the bronchi. He improved very much in Netley, and was discharged from the service, after having been under treatment for six weeks.

Case of hepatic abscess, followed by peritonitis. Death.

Private F. J., 2nd Battalion 21st Regiment, aged 25, 2 years and 4 months' service, invalided from Secunderabad, admitted to Netley on the 4th December, 1870. He had suffered from frequent attacks of malarious fever in India. On admission the principal symptoms were pain and tenderness over an enlarged liver. He had frequent rigors, and a temperature which seldom fell below 100°, and rose frequently to 103°, 104°, and 105°. The pulse varied from 100 to 120. The hepatic dullness posteriorly extended up as high as the lower angle of the scapula. On the 22nd December he began to suffer much from night perspirations. The abdomen became very tender and tympanitic, and there were present all the symptoms of peritonitis. The liver was punctured, and 20 ounces of pus withdrawn by the pneumatic aspirator. On the 11th January, 1871, severe diarrhoea set in, and death took place on the 19th.

Post-mortem Examination.—Seven pints of sero-purulent fluid were found in the abdomen. The intestines were all glued and matted together, so that it was almost impossible to separate them. The whole of the external surface of the intestines presented the appearances of recent severe inflammation.

Flocculi of lymph, in large quantities, were floating about in the abdomen; liver much enlarged; a very large abscess existed in the upper and posterior part of the right lobe; there was no opening from the abscess into the cavity of the abdomen.

Case of hepatic abscess, opened at the epigastrium. Recovery.

Private M. S., 37th Foot, aged 22, 4 years' service, invalided from Meeran Meer. The medical history gives an account of his having suffered from dysentery in 1870, and during the attack he was seized with sharp pain in the liver. A tumour formed, and pointed near the epigastrium. The tumour was adherent to the walls of the abdomen, and about the size of an orange. It was punctured, and 4 ounces of pus were drawn off on the 16th May, 1870. The abscess continued to discharge until the 12th June, when the opening healed up. On admission to Netley he was quite well and fit for duty. There was a small cicatrix to the left of the mesial line in the epigastrium. Discharged to dépôt.

Case of abscess of the liver, simulating ulcer of the stomach. Death.

Serjeant T. E., aged 33, 13th Regiment, admitted to Netley on the 4th April, 1871, in a very anæmic and emaciated condition. He suffered from constant vomiting and great tenderness over one spot in the epigastrium, about the size of a crown piece. These symptoms continued for many weeks, and were occasionally attended with night sweats and rigors. The vomiting was very frequent, and this, with the persistent circumscribed pain and tenderness at the epigastrium, gave rise to the belief, in the first instance, that the case was one of ulceration of the stomach. The liver, however, was found to be

greatly enlarged; high temperature became constant, profuse night sweats supervened, and these symptoms led to the suspicion of liver abscess, although there was no intercostal bulging, or any of the other palpable signs of an abscess. He died on the 11th June.

At the *post mortem* examination an abscess was found occupying the right lobe of the liver, projecting upwards and encroaching upon the right lung. There were besides numerous depôts of pus scattered throughout both lobes: one of these was found intimately connected with the diaphragm and cardiac orifice of the stomach. In fact the œsophagus, liver, and stomach were all involved in it, and were matted together in a mass. This condition of the parts was of course sufficient to account for the train of symptoms which at first led to the belief that the case was one of ulceration of the stomach.

Abscesses of the liver, when seated in the upper and posterior part of the right lobe, sometimes simulate organic disease of the stomach. Another case is fresh upon my memory, in which the symptoms were certainly more indicative of ulceration of the stomach than of liver abscess. The man had been sent home from India suffering from pain in the hepatic region, with constant vomiting. He was admitted to Netley, and on examination presented the following symptoms:—Great prostration; one spot of excessive tenderness in the centre of the epigastrium; he shrank from the slightest touch at this point; the area of this tender spot was not larger than a half-crown piece, and when any pressure was made upon it nausea was immediately produced; he had also pain and a sense of heat and discomfort on deglutition, and the vomiting was very frequent. There was no tenderness over the intercostal spaces; no bulging of the side; very little, if any, increase of the area of hepatic dulness; and no elevation of body temperature at any part of the day, and no sweating, which latter symptoms have almost always been present in the cases of hepatic abscess which have come under our notice in Netley. The negative symptoms seemed to exclude the idea of an abscess in the liver; the positive symptoms pointed prominently to the existence of a lesion of the stomach.

At the *post-mortem* examination, however, a large abscess was found in the upper and posterior part of the right lobe of the liver, and there was no lesion of the stomach whatever.

These two cases are instructive, as illustrating the difficulty occasionally met with in the diagnosis of liver abscess.

Case of hepatic abscess, opened externally. Partial recovery.

Driver J. R., Royal Artillery, aged 33, 13 years' service, admitted to Netley on the 26th May, 1871. He had been attacked in Cannanore in December 1870, with acute hepatitis, which resulted in the formation of an abscess. The abscess pointed near the xyphoid cartilage, and was punctured; he recovered sufficiently to be able to proceed to England. On arrival at Netley the abscess was still discharging; the opening existed to the right of the mesial line; a small quantity of sanious pus oozed from the sinus every day. The patient was in fair health. After over three months' treatment, the opening was still unclosed. He was discharged from the service.

Case of hepatic abscess, discharged through the right lung. Death.

Private M. S., 3rd Battalion Rifle Brigade, aged 30, 11 years' service, invalided from Secunderabad, had suffered from acute hepatitis in September 1870. On arrival at Netley, on the 26th May, 1871, he had severe pain in the right side; cough, profuse purulent expectoration, and hectic fever; the expectoration was brown in colour, and occasionally tinged with blood. There was fulness of the intercostal spaces on the right side, with tenderness as far as the umbilicus, but no fluctuation could be felt. An attempt was made to evacuate the abscess, and two small trocars of Dulafoy's aspirator were introduced at different points, and about 3 ounces of thick grumous blood were drawn off. Severe diarrhoea, attended with great exhaustion, soon after set in, which terminated fatally. There was no *post-mortem* examination.

APOPLEXY.

There were two fatal cases of this disease in the Medical Division during the year.

Sapper M. G., Royal Engineers, aged 25, 3 years' service, was invalided from Gibraltar on the 2nd June, 1871, with enlargement of the liver. On admission to Netley the following symptoms were noted :—Sallow complexion, increased area of hepatic dulness, over-action of the heart. He very much improved in health, and was about to be discharged to rejoin his dépôt when he was seized, on the morning of the 30th June, with severe epistaxis, attended with great giddiness and dimness of vision of right eye. In the afternoon of the same day he became totally insensible; the right pupil was widely dilated; the left contracted; convulsions set in, affecting the right side; pulse slow; breathing stertorous. Death took place on the morning of the 2nd July, from coma.

Post-mortem Examination.—Calvarium adherent to the dura mater; on reflecting the dura mater on the right side, the right hemisphere is covered by a blood coagulum, which extends from the angle of the frontal bone to within an inch of the occipital protuberance, and upwards to within an inch and a half of the longitudinal sinus. Two visible depressions exist on the surface of the cerebrum, on the right side on its lateral aspect. There is also ecchymosis at the anterior part of the cerebrum, in the sulci over the ethmoid bone. On lifting the right hemisphere a very large coagulum of blood occupies the whole of the middle fossa of skull; this coagulum weighs 5 ounces. Yellow softening of cerebral lobes to within half an inch of the base of the corpus striatum; lungs deeply engorged; cavity of the pericardium contains about 2 ounces of serum; spleen enlarged and flabby; liver also enlarged; kidneys soft and large; catarrhal congestion of stomach; Peyer's patches absorbed; remains of old congestion and healed ulcers; sago-grain enlargement of solitary glands; pigmentation of Peyer's patches at the lower part of the intestine, and general atrophy of gland texture.

Case of apoplexy, following Bright's disease. Death.

Corporal R. C., 53rd Regiment, aged 31, 7 years' service, admitted July 25, 1871, with anasarca of lower extremities; urine loaded with albumen; bases of both lungs very dull on percussion; dyspnoea urgent. He remained under treatment for a month, when, on the 30th August, he was suddenly seized with symptoms of apoplexy; he became rapidly comatose, and expired in a few hours.

Autopsy.—General anasarca; brain, convolutions flattened; substance of the brain softened; the pons varolii was completely broken up by a large irregular-shaped recent dark-coloured clot. Effusion of serum to the amount of 2 quarts existed in the pleuræ; small portions of lower lobes of lungs consolidated and carnified; heart considerably hypertrophied; spleen very soft; capsule pigmented; kidneys enlarged, fatty, and easily broken down.

MOLLITIES OSSIUM.

The following case of this rare and remarkable disease will be found interesting :—

Private E. B., 1st Battalion 60th Regiment, 6 years' service, age 27, was admitted to Netley on the 20th July, 1870, suffering apparently from chronic rheumatism, from which affection, the detailed statement of his case stated, he had been suffering for eight months. It was also stated that he had suffered from syphilis, enlarged inguinal glands, indolent ulcers on several parts of the body, and what was considered to be severe rheumatic pains in the bones. On admission from the transport he was quite unable to walk, and when placed in bed could scarcely move his limbs. Three weeks after admission, and while he was being lifted out of bed, the right femur was fractured about its centre; this was attended with very severe pain. On examination of the chest with the stethoscope the heart was found enlarged, and a loud rasping murmur was discovered, the maximum intensity being over the base.

For three months he continued in a state of wretched health. The pains

throughout the body, especially in the lower extremities, were intensely severe, and were only relieved by opiates. Not the slightest attempt at union had taken place in the broken thigh. It was now observed that the opposite femur was curved, and that he had lost all power of motion of that limb. From this period, in October 1870, the disease made rapid strides. The long bones of the upper extremities began to soften, and the action of the muscles caused them to bend, and to assume fantastic shapes. The bones of the face and head were next attacked. The countenance became completely altered. The face became flattened. The prominence of the bridge of the nose partially disappeared. The teeth became quite loose, and the miserable patient lost all power of mastication, and could only swallow fluids. He was utterly unable to move his head in any direction, and his arms and hands lay powerless on the bed.

The bones of the cranium felt soft, and yielded to pressure. The last bony structures attacked were the ribs, and this was first evidenced by painful and difficult respiration, and by alteration in the shape of the chest.

The thorax became flattened in its antero posterior diameter, and bulged out laterally. He lingered on in this pitiable condition until the 13th of February, 1871. Death took place from the pressure of the atmosphere upon the organs of circulation, and respiration within the chest. The efforts of the patient to expand the chest were very painful to witness; but the muscles were unable to raise and separate the softened and distorted ribs, and the mechanical pressure of the atmosphere upon the enlarged heart, already labouring under an obstructive disease, hastened the fatal result.

Owing to pressure of work, and to the fact of Professor Aitken having been absent during the vacation at Netley, the *post-mortem examination* was not made with as much minuteness as perhaps it otherwise would have been.

The following, however, were the principal facts elicited at the autopsy:—

Every bone in the entire skeleton was affected with this disease. They were as far as could be observed by the eye, by touch, or by incision, with a scalpel, almost completely deprived of their earthy constituents. The bones of the cranium were so soft, that a knife could be passed through them at any point with the greatest ease. Sections of the long bones were made in their long axes, and Dr. Welch, Assistant Professor of Pathology, at Netley, informed me that he was able, with a common scalpel, without difficulty, to make a longitudinal section of a femur throughout its entire length, including the head and neck.

On examination, the shafts of the long bones were found shortened by curves, and the heads and epiphyses appeared crushed in upon the shaft. The cortical substance of the shafts was very thin, showing that the morbid process, whatever its nature may be, is eccentric in its progress. This substance had a leathery ligamentous appearance, and appeared to have lost all the external characteristics of true bone. The extremities of the long bones were quite as soft, and as easily cut as the shaft.

The medullary canal presented a very remarkable appearance. The medulla was enormously hypertrophied, and was much firmer than in the healthy state. Its colour was completely altered, and it had in fact the appearance of a partially decolourized coagulum of blood.

In the right tibia there were at the upper and lower extremities of the bone on section two circumscribed deposits in the cancellated structure, oval in shape, and yellowish in colour, and very much resembling the gummatous nodules now recognised as syphilitic deposits.

Some parts of the calvarium were macerated and dried, and presented a very remarkable appearance. They were extremely light and friable, crumbling to powder by slight pressure. The section showed that the bone was much thicker than in the normal state, that is to say the inner and outer tables of the skull were separated from each other to a considerable extent by hypertrophy, and dilatation of the cells of the diploe.

The whole skeleton, with the exception of those parts which have been preserved in spirit, was placed in the macerating trough, and on examination afterwards, every bone throughout the entire body presented the appearances already described.

With regard to the other organs, which were examined, the lungs were found healthy. The heart was enlarged; the left ventricle hypertrophied, and

there was well-marked narrowing of the aortic orifice. The liver, as might have been expected, was extensively affected with lardaceous degeneration.

Case of Saccharine diabetes treated by the administration of a purely skim-milk diet:—

Private H. H., 25th Regiment, aged 26 years; 4 years' service; served 3 years in India, where he suffered from liver complaint. On the voyage home, in March 1871, he was attacked with symptoms of diabetes. He was admitted to Netley Hospital on the 8th April. He was then passing about 15 pints of urine daily, containing a large quantity of sugar, with a specific gravity of 1.030. He was emaciated, and very weak. He was placed on a diet composed principally of fish, fresh mutton, bran biscuits, and a small quantity of milk. With occasional variation he was kept on a diet of this kind for three months. The mineral acids were prescribed, and opium occasionally administered. There was, however, no improvement. The quantity of urine now passed was undiminished, and the patient had become so weak that he was unable to leave his bed.

It was now determined to give a trial to a purely skim-milk diet, as recommended by Dr. Donkin, of Durham; he was placed on four pints of milk per diem to the exclusion of every thing else. This was on the 14th July. On the 15th, within 24 hours, the quantity of urine passed fell from 13 pints to 9. The skim-milk was now increased to 8 pints daily, and finally to 9 pints divided into four meals. On the 18th July, three days after the milk treatment was commenced, the quantity of urine passed had fallen to 5 pints 14 ounces. On the 19th he passed 4 pints 15 ounces. On the 24th 3 pints. On the 31st 2 pints; he remained in the hospital until the 18th August, and the quantity of urine passed daily did not then exceed 2 pints 7 ounces.

I do not bring this case forward as an instance of *cure* by the skim-milk treatment, because although the most marked and sudden diminution of the quantity of urine and sugar passed took place there was not a corresponding diminution in the specific gravity, or in the percentage of sugar passed. But I certainly do think that this case shows the importance of this mode of treatment as evidenced by the following facts.

The general health of the patient improved immensely after he had been taking the milk for a few days, he felt stronger and better than he had done for months; he lost the feeling of lassitude and malaise which he had before experienced; he was able to leave his bed and walk out for exercise in the hospital grounds. The intense thirst which is so distressing in these cases was allayed. His nights were quiet and peaceful; instead of having to empty his bladder five or six times during the night, he had only to do so *once*. The voracious appetite, which he could scarcely satisfy, even when taking large quantities of animal food, no longer consumed him; his weight increased by about 7 lbs., and his spirits, which were of the lowest, became bright and cheerful, and he acknowledged the comfort and benefit he had derived from the milk treatment.

In this case there was no difficulty in giving the milk until the patient had been taking it for more than a month, when he began to get tired of it, and craved for other food; but his desire to recover kept him from transgressing the rules. He was discharged from the service at the end of August, greatly improved in health; whether he has adhered to the injunctions given him with regard to diet, I cannot say.

Case of ossification and necrosis of one of the laryngeal cartilages. Tracheotomy:—

Private J. C., 31st Regiment, aged 37, was admitted to the Royal Victoria Hospital on the 12th December, 1871. He had served 20 years; while he was quartered at Portsmouth in 1866 he contracted a sore on the penis. The character of this sore is not stated in his official medical history, and it is therefore impossible to say if it was a true syphilitic chancre, or a soft non-infecting sore. He was treated with iodide of mercury; but not to the extent of salivation, and as none of the constitutional effects of syphilis appeared for a period of four years, it is difficult to connect the symptoms which followed with a syphilitic taint.

In June 1870 he began to suffer from hoarseness, loss of voice, and dysphagia. This was followed by the formation of a large abscess in front of

the neck. He describes this swelling as having been as large as his closed fist, and occupying the space between the lower jaw and the middle of the thyroid cartilage, and bulging as far forward as the chin. It was extremely tender and painful. This abscess was opened in two places, one incision was made to the right of the thyroid cartilage on a level with the pomum adami. The other opening was made at the inner edge of the right sterno-mastoid muscle close to the clavicle. A large quantity of pus was discharged. The tumour disappeared, and the incision healed up; *but the opening of the abscess was not attended with any alleviation of the symptoms of aphonia or dysphagia.* His condition on arrival at Netley was as follows:—Great dyspnoea, evidently produced by mechanical obstruction to *inspiration*, each effort to inspire being accompanied by a harsh stridulous voice. The voice was reduced to a whisper. He was unable to lie down. The countenance was anxious, but there was no abnormal rapidity of pulse, or increase of temperature. On examining the neck externally, there appeared some thickening of the skin over the thyroid and cricoid cartilages.

The space between the thyroid and cricoid was diminished. On placing the finger on the cicatrix of the upper incision already alluded to a distinct depression in the right ala of the thyroid could be felt, indicating loss of substance at this point; but no pain or tenderness on pressure could be detected over any part of the cartilaginous skeleton of the larynx.

On examination with the laryngoscope, the ary-epiglottidean folds were found swollen. The left was displaced and pushed over to the right side. The vocal cords appeared healthy; but immediately below the left vocal cord a whitish tumour appeared, protruding into the cavity below the cords, and partially closing the rima.

As the case was urgent, everything was prepared for the operation of tracheotomy in the event of any paroxysm of dyspnoea supervening. The symptoms having become alarming about 1 A.M. on the morning after his admission, the trachea was opened by Surgeon-Major Mackinnon, C.B.

The operation was followed by instant relief to the patient; he breathed quietly and easily through the tube, and there was a cessation at once of all dyspnoea.

For a week the patient progressed most favourably; but at mid-day, seven days after the operation, he coughed up suddenly a small piece of bone. The fragment was very foetid when first examined. In shape it presented somewhat the outline of the inferior and posterior angle of the thyroid cartilage.

At first it was conjectured that it might possibly have been a piece of mutton bone that might have lodged in the larynx by accident. But the patient positively declared that no such occurrence could have taken place without his knowledge, and the shape and appearance of the fragment gave no confirmation to this conjecture. It became a question of difficulty to decide from what structure this fragment could have been detached. The os hyoides was carefully examined and found intact. The spine was examined from behind, and no tenderness could be discovered indicative of disease of any of the cervical vertebrae. And in addition to this, the fragment did not present the large cancellated structure characteristic of the body of a vertebra. There could, therefore, be little doubt as to the nature of the case, namely, that ossification of some part of one of the laryngeal cartilages had taken place, followed by necrosis, resulting in the large abscess already alluded to.

Most probably the abscess was a consequence of the separation of the sequestrum, and the latter failing to find its way through the incisions in the neck, became fixed in the larynx, under the mucous membrane, and caused the whitish tumour, which I have already alluded to as having been seen with the laryngoscope.

The subsequent history of this patient may briefly be alluded to. For two months after the operation his convalescence progressed in the most satisfactory manner. The tracheal tube was removed, the opening healed up, and it was hoped he was on the fair way to perfect recovery. The swelling and thickening about the rima had disappeared, although still some narrowing of the orifice remained, together with a little stridor on deep inspiration. He was, however, again attacked with urgent obstruction in the larynx, and it was found necessary to perform tracheotomy a second time, which, as on

the first occasion, at once relieved his symptoms ; he has continued to wear the tube ever since, and most probably will have to do so for the rest of his life. He has been discharged from the service, and Dr. Morel Mackenzie has, at my recommendation, kindly admitted him into the hospital for diseases of the throat in Golden Square. It is possible that the pathological conditions existing in this case may have had a syphilitic origin. But the facts regarding a syphilitic taint are certainly obscure. Most probably the affection is more allied to those described by Dr. Wilks, where he remarks that although many chronic affections of the larynx have a syphilitic origin, there is, however, an affection independent of syphilitic taint, attended with pain and swelling about the larynx, and followed by abscess, either within or without. Very commonly one ala of the thyroid becomes converted into bone, dies, and exfoliates, originating probably first in perichondritis, then ossification, and finally necrosis.

There can be no question that in this case the patient on admission to Netley was in imminent danger, and that the promptitude with which the operation of tracheotomy was performed saved his life.

APPENDIX No. X.

TABULATION OF CASES FROM THE NECROLOGICAL REGISTER
OF THE ROYAL VICTORIA HOSPITAL, NETLEY, WITH
SLIGHT EXPLANATORY REMARKS.

By Staff Assistant-Surgeon F. H. WELCH, F.R.C.S., Assistant to the Professor
of Pathology.

LESIONS OF THE LIVER.

IN pursuance of the object set forth in the "General Observations" of the preceding paper (Blue-Book 1870, p. 381), the present is the second series of cases of the rough morbid anatomy details of chronic army disease.

In this series I have thrown together individual examples of disease, arranged in nomenclature under different headings, but representing one or other form of lesion of the liver seen among soldiers. As far as the classification of diseases causing death among the invalids from foreign service is concerned (p. 381, Blue-Book 1870), the majority of the chronic dysentery cases is included in the present category, a death from uncomplicated dysentery—absence of liver abscess—being the exception; otherwise the remaining examples of disease here detailed figure chiefly under the 5·8 per cent. of lesions, "small in importance as regards numbers." They have, however, this in common—that the immediate death causation was entirely or mainly due to the involvement of the liver; and thus they illustrate the coarse morbid anatomy details of hepatic derangements terminating fatally, either alone, or in conjunction with other lesions of the body originating in a common cause, the hepatic symptoms predominating clinically.

The explanatory remarks upon this series of cases are of a very cursory nature, the intention being, as previously observed (p. 383, Blue-Book 1870), "to allow the individual cases to depict their special peculiarities" and to furnish incidental observations only, "which may assist in elucidating obscure "points, and furthering inquiry" by "giving a general sketch of the class of "lesions" under consideration.

With this premise, explanatory of the system adopted, the cases detailed may be arranged under the following headings:—

1. Abscess of the liver, the sequel of dysentery. Case 1—7.
2. Abscess of the liver independent of precursory intestinal lesion. Case 8, 9.
3. Cirrhosis. Case 10, 11.
4. Cirrhosis and syphilitic deposit combined. Case 12.
5. Syphilitic deposit and cicatrices. Case 13.
6. Fibroid enlargement. Case 14.
7. Pigmental degeneration. Case 15.
8. Hydatid growth. Case 16.
9. Lardaceous disease. Case 17.

Dysenteric suppuration in the liver.—Of this form of lesion, seven cases are brought forward in invalids from India or China. The duration of the intestinal mischief varied from three months to two years four months. The abscess in the liver ranged in size from a nut to a sac containing 180 ounces of pus (Case 7); in four instances the suppurating foci were multiple—in three, solitary; as a rule, limited to the right lobe of the viscus, and always so when solitary (Cases 3, 5, 6); in one (Case 2) the abscesses were apparently connected with the veins of the viscus, sloughy ulceration of the intestines and enlarged mesenteric glands (embolic); and in one (Case 4) numerous small abscesses were connected with lymph exudation between the base of the right lung and diaphragm. The contents of the abscesses were—thick creamy pus, yellow

shreddy pus, dark green purulent fluid, shreddy purulent fluid with blood *débris*. The abscess walls were—firm liver substance,—disintegrating visceral elements,—firm smooth membrane,—dense fibroid sac; these varying phases of the surrounding medium being apparently unconnected with any special locality of suppuration, or duration of the disease. In two instances (Case 2 and 6) the hepatic abscess was connected with one in the base of the right lung through the diaphragm; in one (Case 1) there is the same apparent tendency to discharge of the liver pus through the pulmonary viscus; in two the pointing is towards the ribs externally; in one towards the aorta, inducing inflammation of the lining membrane of the vena cava (Case 5); and in one towards the lumbar region. Of the surrounding liver substance the condition was—normal, fatty, granular degeneration, increase of the connective tissue between the acini. Of the condition of the intestinal lesion at the time of death:—in two cases (4 and 5) there were merely cicatrices remaining to indicate the site of prior ulceration; in one (7) the ulcers were in process of healing; in three (1, 2, and 6) the ulcers were old and indolent; and in one (3), while no trace of the original dysentery was apparent, the tissues around the caput cecum were sloughy, and coagulable lymph was present around rectum.

Hectic and exhaustion were the main systemic features connected with the pus in the liver.

Of the associated lesions in the body, these were of two forms—one connected with the presence of the inflammation and suppuration in the liver, *local*, and consisting of surrounding adhesions, serous fluid in the abdomen, pleurisy, basal congestion or consolidation of the lungs. The other, connected with the dysenteric poison, *general*, and consisting of degrees of ulceration of the large gut, and its local results, involvement of the caput cecum and lower portion of the small intestines in congestion, gland prominence, lesion of Peyer's patches, diphtheritic exudation, &c.; atrophy and anemia of the body generally; serous exudation into cavities; congestion, and granular degeneration of the renal organs.

In the chronic dysentery cases, unconnected with hepatic suppuration, the liver is rarely normal—congested, fatty, or lardaceous.

Abscess of the Liver independent of precursory intestinal lesion.—Of this form of lesion, rarely exemplified among the invalids from the tropics, there are only two cases throughout the entire mass of deaths. Both followed *hepatitis* in India; the suppuration is multiple, and the tendency in both is to the discharge of the pus through the lungs. Case 8 is associated with the syphilitic virus in the system, and in Case 9, dysenteric-like implication of the large intestines complicated the latter days of life.

With reference to the multiple character of hepatic suppuration, this would appear to be decidedly the rule; and even when the sac is solitary, the irregularity of its outline, the existence of globular offshoots from the main central cavern, favour the idea of an original multiplicity of pus foci coalesced into one common cloaca by the degradation and disintegration of the intervening tissue.

Of lesions simulating hepatic abscess the following are observed in the pathological records—right pleurisy and effusion, circumscribed empyema, right renal abscess.

Cirrhosis of Liver.—Two examples only are to be found, both in very intemperate men, the viscus presenting the usual hob-nail aspect, with adhesions of its capsule to the surrounding tissues, and associated during life with the ordinary symptomatology. More minutely examined, fibroid tissue is seen to permeate every portion of the organ, constricting each acinus, separating one line of cells from the other in the acinus, and even isolating the individual cells, obstructing the passage of the bile, leading to its accumulation in the small ducts and coloration of the acini, and often inducing fatty degeneration of the hepatic cells. In both instances the spleen is remarkably enlarged, lardaceous in one, malarial in the other.

Referring to the etiology of the lesion, its connection with alcoholism is clear, yet it is unquestionable that the examples met with are proportionately infinitesimal in numbers, compared to the frequency of "drum drinking" among soldiers. It must be conceded, either that the lesion is but a rare sequel of alcoholism, or that the cirrhotic liver is the chronic form only of a more

acute disease generated by alcohol and generally fatal during the early stage. Assuming the latter to be the fact, the mass of the sufferers from "drum drinking" must succumb to the acute stage and die in the tropics, while it is merely the ulterior result (in the minority) which is seen among the invalids as a chronic malady in the form of a cirrhotic contracted viscus—an opinion held also by Professor Maclean, C.B.

Syphilitic and Cirrhotic changes combined.—Case 12 is entered as exemplifying the concurrent lesions in the one viscus due to the specific virus and alcoholism; the primary clinical feature being *hæmatemesis* rapidly followed by *ascites*. The liver is observed to be furrowed in all directions by dense fibroid cicatrices, with fibrous nodules and calcareous degenerations resulting from the same; while the portions of the viscus between the syphilitic changes depict the ordinary features of cirrhosis. A character of alcoholic import is the quantity of yellow fat deposited on all the organs.

Syphilitic Deposits and Cicatrices.—I have entered this case (13) here, inasmuch as it is not included among the syphilitic lesions of the liver previously detailed (Blue Book 1870, Cases 22-77), and as a contrast to the cirrhotic examples. As far as the liver lesion is concerned, the main clinical feature, *ascites*, is common to both syphilis and cirrhosis. The coarse, morbid anatomy details of the gummatus liver are—extensive nodulation and deep furrowing of the surface of the viscus, with firm fibrinous *localised* cicatrices penetrating the parenchyma to a various depth, connected with loss of substance, and leaving the intermediate portions of the organ healthy, or partially degenerate; fibrinous nodules; and calcareous residue; as contrasted with the uniform surface irregularity and *general* fibrosis of the contracted alcoholic liver. In both forms bile straining, from the constriction of the ducts, is present. In the syphilitic form the fibrosis is local and connected, as a sequel, with actual loss of the parenchyma, in the cirrhotic it is general and primary; the morbid anatomy is explanatory of the oft coincidence of the common clinical feature—*ascites*. It is rarely that we see in this viscus the early stage of the gumma; only the ulterior destructive or degenerative results.

The presence, however, of an excess of cellular tissue elements generally dispersed throughout the viscus—fibroid enlargement—in connection with the syphilitic virus is not uncommon (Blue Book 1870, p. 384), and Case 24 of the syphilitic series, exemplifies a cirrhotic-like surface condition associated with this fibroid tissue hypertrophy; which is, however, opposed to the diminished bulk of cirrhosis proper.

The frequency with which the clinical features of "chronic hepatitis," and "hepatic enlargements" are found dependent on lesions of the liver, undoubtedly syphilitic, has been already mentioned (Blue Book 1870, p. 385), a point of possibly valuable therapeutic import. The diagnosis of the specific nature of the hepatic disease would be assisted by the clear evidence of infection, and the presence of the results of special lesions on the surface of the body, or within the range of the eye. Following the reception of the specific virus in the system, the high percentages of "gummata in the liver," "cicatrices and loss of liver substance," and "fibroid enlargement" (Blue Book 1870, p. 384), show this viscus to be one of the most common sites of the diseased process set in action by the enthetic poison—facts of very valuable significance in reference to diagnosis and special therapeutical measures.

Fibroid Enlargement.—Hypertrophy of connective tissue elements with apparent atrophy of the acini, associated with same condition in the spleen, and dependent on the malarial poison—the two viscera making up more than one-fifth of the total body weight. This case (14) is mainly interesting, as exemplifying the remarkable influence of marsh miasm on the blood, tissues, and viscera, even the bones not escaping. A marked diminution of the red corpuscles of the blood with excess of white, death from lung congestion, and clogging up of the areolar tissue of the body and serous cavities with exuded serum, are observed with this fibroid enlargement of the liver and spleen. The disorganisation of the right supra-renal capsule is also noteworthy.

Pigmental Degeneration.—Brownish black small pigment particles pervade all parts of the viscus. In Case 15 this is also shown as another and a very common result of the malarial poison and present also in the spleen, frequently pervading all the organs and tissues of the body. In the example adduced the

red corpuscles of the blood were remarkably reduced, and the atrophy and anæmia of the whole frame is noteworthy.

In Case 24 of the syphilitic series the presence of numerous lymph corpuscles in a non-coagulable blood is associated with a fibroid enlarged malarial spleen filled with similar colourless corpuscles.

Hydatids in the Liver.—Originating in the Mediterranean, a feature of locality which has received great attention from Professor Maclean, C.B., and referred to by Professor Parkes (*Practical Hygiene*, p. 559) who remarks:—"There is a suspicion at Netley that the cases of echinococcus of the liver are more frequent in the men from the Mediterranean stations than others." Examples of this lesion are few among the pathological records, consequent on the majority of the illustrative cases being discharged from the service before a fatal issue. In one other instance, from India, hydatid cysts of no large size, unconnected with death agency, were observed in the liver; and two other instances of the cestoid worm are met with from the Mediterranean—in one involving the left lung, in the other occupying the pericardium as a degenerate cyst. In Case 16 the nature of the disease was apparent before death from the vomiting of the parasites, these having passed from cysts in a state of suppuration through an ulcerated communication into the stomach; death, however, resulted from peritonitis in connection with a perforating ulcer of the duodenum.

On the subject of the intestinal worms, *tænia mediocanellata* was noted in men from the Cape, India, and the Mediterranean.

Lardaceous Disease.—One example only is detailed as an illustration of a common lesion, and in this instance, conjoined with similar disease in other viscera in sequence of long-continued suppurative action in the vertebral bodies. As observed in the liver, this substitution of the normal elements of the tissues by a nitrogenous principle lower in the stage of organization, is generally accompanied by fatty degeneration, the two changes being seen side by side in the viscus, dovetailing into each other often in a serpiginous manner, each, however, being distinct as having its own naked eye and microscopic characteristics. Not uncommonly, also, fatty degeneration of the cells of the acinus follows the lardaceous disease of the vessels.

This well-known form of lesion of the liver is a very frequent sequel of the syphilitic virus (*Blue Book* 1870, p. 384), but observed also in all cachectic states of the system, no matter how induced, and common to many of the viscera of the frame, as though the healthy nutritive elements in the blood being deficient or altered, the tissues were unable to assimilate the material presented to them to their own proper normal standard, but elaborated a structure lower in organization, which gradually supplanted the healthy original atoms, and was necessarily incapable of performing the normal functional process of the viscus. As exemplified in the army disease we observe the lardaceous changes in the liver connected with the following components—(a) limited to hepatic capillaries, (b) involving also the hepatic cells, (c) interlobular arterial implication with fatty degeneration of the cells of acinus, (d) affecting the tissue of syphilitic cicatrices, (e) involving the elements of hypertrophied connective tissue. In this disease the organ is firm, translucent, smooth, and of a high specific gravity, though not uncommonly the admixture of the fatty degeneration with its low comparative weight counteracts the lardaceous disease, and so retains the specific gravity of the entire viscus within the normal range.

Next to syphilis the lardaceous disease in the liver is more frequently noted in connection with destructive lung disease. The more common condition of the viscus in consumption is the enlarged fatty degenerated organ in which the cells are noted as laden with fat globules and granules. The term degeneration is probably misplaced under these conditions, inasmuch as the true state of the viscus is rather one of fat accumulation—a storing up of oleaginous particles probably dependent on the large amount taken into the stomach under the form of cod liver oil.

In two cases of diabetes, the liver was enlarged, with a high specific gravity and granular state of the hepatic cells.

A point to be noted is the frequency with which the liver and spleen are associated in disease processes, and especially when these partake of a general character,—e.g., marsh miasm, syphilis. The liver may be affected *per se*,

equally also the spleen, but it is rare for the former viscus to show any long-continued morbid action without the spleen partaking in it also, or showing a textural derangement in some one or other form dependent on the hepatic lesion. This marked mutual bearing of the one organ towards the other under disease is highly suggestive of some very intimate connection in physiological working hitherto hidden from us, but which morbid anatomy unquestionably indicates without, however, expounding its nature.

With these preliminary observations on the more common chronic diseases of the liver producing death in the army, the details of the individual exemplifying cases are as follows :—

No. of Case.	Age.	Years of Service.	Details of Service in sequence.	Previous History of Disease in sequence.	Where Fatal Lesion contracted.	Duration of Lesion.	Duration of last Hospital Admission.
1	29	9 $\frac{2}{12}$	Home .. 2 India .. 7 $\frac{2}{12}$	1. Dysentery Acuta 2. Febris Continua 3. Dysentery Acuta 4. Hepatic Abscess	India	Dysentery 780 days	?
2	23 $\frac{2}{12}$	5 $\frac{2}{12}$	Home .. 1 China .. 4 $\frac{2}{12}$	1. Remittent Fever 2. Febris, C. C. 3. Dysentery 4. Hepatic Abscess	Hong Kong	Dysentery 8 months	?
3	27 $\frac{5}{12}$	9 $\frac{1}{12}$	India	1. Ophthalmia 2. Dysentery 3. Hepatitis 4. Dysentery 5. Hepatic Abscess	Calcutta	?	..
4	36	3 $\frac{6}{12}$	India	1. Delirium Tremens 2. Febris Intermittens 3. Syphilis, Primary 4. Dysentery Acuta 5. Hepatic Abscess	India	?	?

Predominant Symptoms characterising last illness.	External Appearance.	Cranium, Spinal Canal and Contents.	Neck, Chest, and Respiratory Organs.
Severe dysenteric symptoms; great abdominal tenderness	Weight 77 lbs. Girth 33 inches Great emaciation	Yellow lymph deposits in arachnoid; enlarged pacchionian glands; pia mater adherent to dura mater, congested; decolorized clots in superior longitudinal sinus; atrophy of substance of convolutions posteriorly Brain 2 lbs. 15 oz.	Dense right pleural adhesions; left lung condensed at base
Hæmoptysis; cough; liver enlargement; blood in stools	Girth 32 inches Weight 96 lbs.	Considerable serous effusion over brain surface; some thickening and degeneration of vessels at base of brain; serum in ventricles with anæmia of choroid plexus Brain 3 lbs. 2 oz.	The whole of right lung involved in a large abscess communicating with liver; left congested at base
.. ..	.. ..	Dura mater adherent and yellow, especially along longitudinal sinus; pia mater very vascular over cerebral surface; anæmia of brain substance	Tracheal mucous membrane pale; cretaceous nodule in apex of right lung; slight congestion posteriorly
.. ..	Weight 95 lbs. Girth 30½ inches	Dura mater yellow; sub-arachnoid effusion and arachnoid opacity; shrinking and hardening of tissues at the decussation of optic nerves; brain substance anæmic; yellow serum in ventricles; choroid plexus bloodless	Pleura adherent, fluid in left cavity; lungs much congested posteriorly with patches of red hepatization; small abscess cavity in left apex, no tubercular deposits

No. of Case— contd.	Heart and Vascular System.	Peritoneal Cavity.	Alimentary Canal.
1	<p>Heart small, apex round; white coagulum in right cavities and pulmonary artery</p> <p>Measurements: extreme length .. 4.6 in. length of ventricles 3.3 in. width 3.1 in.</p> <p>Orifices: right auriculo-ventricular 1.32 in. diameter pulmonary artery 1.03 in. diameter left auriculo-ventricular 1.18 in. diameter aorta .92 in.</p>	.. ..	<p>Ulceration of tonsils; stomach congested with pigmentation at pylorus; Peyer's patches ulcerated; transverse colon adherent to liver and gall bladder; old ulcers extending throughout large intestines, in some parts exposing the peritoneum. General contraction of gut</p>
2	9½ oz. normal.	<p>Adhesion of peritoneum to right iliac fossa. 30 oz. of serum in cavity</p>	<p>Calibre of small intestines contracted; Peyer's glands atrophied with melanotic deposit; gland surfaces sieve-like, at lowermost patch large white ulcers, sloughy and exposing, when slough removed, clean sharp cut edges; caput cæcum covered by small ulcers, exceedingly close; ulcers throughout colon and especially in rectum; mesenteric glands in connection enlarged</p>
3	<p>Opacity on anterior surface of pericardium and over coronary vessels; substance of heart flaccid; left ventricle filled with dark-coloured blood</p> <p>Measurements: 5.3 × 3.9 × 3.5 + 8.5 in. circumference</p> <p>Orifices: right, 1.67 and 1.18 in. diameter left 1.45 and 1.03 in. „</p>	<p>Omentum adherent inferiorly to peritoneum and especially in iliac regions</p>	<p>Mucous membrane of stomach congested; extensive disorganization of tissue around caput cæcum, its mucous membrane entirely gone; tissue breaks down on handling; little of original dysentery visible; coagulable lymph in cavity of perivis around rectum</p>
4	<p>Decolorized clot in right cavities extending into ramifications of pulmonary artery; decolorized coagulum in aorta</p> <p>Measurements: 4.6 × 3.9 × 3.9 in.</p> <p>Orifices: right, 1.32 and 1.18 in. left 1.32 and 1.03 in.</p>	.. ..	<p>Stomach firmly adherent to left lobe of liver. Rectum marked by cicatrices and melanotic deposit</p>

Liver.	Spleen.	Pancreas and Suprarenal Capsules.	Kidneys.	Bladder and Generative Organs.	Joints, Bones, and Muscles.
<p>3 lbs. 8 oz. Two abscesses are seen, one pointing to diaphragm, the other to chest wall, a thick layer of lymph overspreads the latter. On removing liver a third is seen, pointing to lumbar region; a fourth forming in lobus quadratus; a fifth, deeper; all separate; from a walnut to orange. A number of very small ones are apparent elsewhere on section; cicatricial loss of substance at lower margin, left lobe</p>	5 oz.	.. ..	10½ oz. Capsule not easily separable; stellate congestion on surface and in substance		
<p>Some opacity and cicatricial loss of substance superiorly; lower margin reaches the level of umbilicus; two larger abscesses, one above the other, not communicating, but the upper with lung through diaphragm; part involved is that in front of lobulus quadratus; several smaller ones in structure apparently in connexion with the veins</p>	14 oz. Soft; malpighian sacculi visible	.. ..	12½ oz. Capsule easily separable; showing considerable surface congestion		
<p>Dimensions 9.8 × 6.6 × 3.8 in. thick; congestion of surface; acini distinct from interlobular congestion; right lobe soft, flaccid, circumscribed abscess in centre, no tendency to point. No induration of walls, containing yellow shreddy pus; degeneration of acini marked out by white tissue surrounding them</p>	Normal; sacculi visible	Pancreas soft and flaccid	Capsules adherent		
<p>Measurements 13.5 × 8.3 × 3.9 in. Anterior surface adherent to abdominal walls; space between the lobes filled by an abscess adherent to colon; about 1 inch from edge of suspensory ligament the tissue of liver is broken down and surface of diaphragm adherent; this is converted into a yellow slough, but separated from pleural cavity by a dense white tissue which is studded with small abscesses and portions of tissue tending to suppuration; greater portion of right lobe occupied by a cavity with dark green purulent fluid, bounded by a consistent firm membrane; one abscess adjoining the gall bladder is highly tinged with bile, and lined by a smooth membrane</p>	Firm; small	.. ..	Soft; flabby, with enlargement of cortical substance		

No. of Case.	Age.	Years of Service.	Details of Service in sequence.	Previous History of Disease in sequence.	Where Fatal Lesion contracted.	Duration of Lesion.	Duration of last Hospital Admission.
5	29	8	Home India	1. Dysentery Acuta 2. Hepatitis, Chronica 3. Dysentery, Chronica 4. Hepatic Abscess	India	?	?
6	?	20 $\frac{7}{12}$	Home Cape India	1. Bronchitis 2. Hepatitis 3. Dysentery 4. Hepatic Abscess.	India	?	?
7	24	4 $\frac{1}{12}$	Home India	1. Syphilis 2. Dysentery 3. Hepatitis Acuta 4. Bronchitis 5. Dysentery 6. Hepatic Abscess	India	Dysentery 2 $\frac{4}{12}$	2 months 23 day
8	27 $\frac{4}{12}$	9 $\frac{1}{12}$	Crimea .. 1 Turkey .. 1 India .. 7 $\frac{5}{12}$	1. Catarrh 2. Syphilis 3. Hepatitis and abscess	India	9 months	57 days

Predominant Symptoms characterizing last illness.	External Appearance.	Cranium, Spinal Canal and Contents.	Neck, Chest, and Respiratory Organs.
.. ..	Weight 102 lbs. Girth 31 inches	Dura mater congested over vertex; opacities in arachnoid	Pleura at base of right lung adherent to chest wall and diaphragm, very vascular
Profuse expectoration of pus with bile; liver pain; hectic	Girth 30 inches Weight 95 lbs.	Normal	Thoracic glands enlarged; firm adhesion of right pleura; much purulent dark matter in bronchi; miliary tubercle in left apex; right lung congested; lower lobe enlarged, indurated, the seat of a large cavity communicating through diaphragm with liver; walls irregular and shreddy, with openings of numerous bronchi; lung tissue around consolidated
Dysenteric symptoms; liver pain and swelling; evacuation of 80 oz. pus by operation on 3 separate occasions; lung symptoms, exhaustion	Girth 34 inches Weight 154 lbs. Cicatrix on penis	.. ..	Scrofulous enlargement of glands at tracheal bifurcation; pleural adhesions left side; right also, and to diaphragm; left lung softened near apex; no deposits
Hæmoptysis, cough, and hepatic symptoms	Extreme emaciation; cicatrices on penis and in groins	Slight porosity of calvarium at vertex; sub-arachnoid effusion. Brain 3 lbs. 4 oz.	Slight pleural adhesion left side: base of right lung firmly adherent; a large abscess in lower lobe in connection with one in liver; left lung crepitant

No. of Case— contd.	Heart and Vascular System.	Peritoneal Cavity.	Alimentary Canal.
5	Lining membrane of vena cava inflamed opposite hepatic abscess with coagulum adherent to inner coat	.. ..	Duodenum strongly adherent to liver, over the site of abscess; cicatrices of old ulcers in colon, with chronic thickening and induration here and there
6	White spot anteriorly; fibrinous clot in left ventricle; muscle pale and flabby	.. ..	Stomach pigmented; colon greatly pigmented and thickened; numerous oval and irregular ulcers in transverse, and descending portions, and rectum
7	Commencing opacity on heart's surface; partially decolorized firm coagulum in right cavities, dark in left, firm in aorta; slight atheroma of mitral valve. 9 oz. Normal	Serous fluid	Small intestines amyloid; solitary glands near caput caecum engorged; large patches of ulceration in caecum in process of healing; cicatrices of healed ulcers throughout colon
8	Partially decolorized coagulum in right side firmly adherent to walls; decolorized in left, extending into aorta 3½ inches; cicatricial loss of substance of lining membrane size of a florin in descending portion	Enlarged lymphatics between base of pericardium and liver	Ulcer on left tonsil; mamillation of mucous membrane of stomach

Liver.	Spleen.	Pancreas and Suprarenal Capsules.	Kidneys.	Bladder and Generative Organs.	Joints, Bones, and Muscles.
Liver adherent to diaphragm, abdominal walls and right kidney. Right lobe projects upwards and backwards, the seat of a large abscess tending to point towards abdominal aorta at opening in diaphragm; granular degeneration of substance around; tissue friable	Amyloid	Hæmorrhagic degeneration of right supra- renal capsule	Granular degene- ration; softening of texture; in- tense congestion of pyramidal por- tion with thicken- ing of cortical		
4 lbs. 2½ oz. Right lobe enlarged, abscess on upper surface 13 in. x 6; no lining membrane; boundary, the disintegrating liver structure; abscess not extending deeply into liver; aperture through diaphragm large and ragged; substance pale, fatty	2½ oz.	Pancreas 12½ oz.	12½ oz.		
Weight, with parts of organs ad- herent, 8 lbs. 9 oz. Dimensions, 20 in. x 9 x 4 in. thick; adherent to diaphragm and right lung, chest walls, right kidney (flat- tened out), pancreas, duodenum and transverse colon; the whole of right lobe. (except a small portion posterior and external), together with lobus quadratus, occupied by abscess 10 in. x 7; sac formed of dense fibrous tissue ¼-inch thick; inner sur- face shreddy, containing 80 oz. of shreddy purulent fluid, <i>débris</i> mixed with blood; the thinnest portion of sac corresponded to chest parietes; small isolated abscesses pervaded the remain- ing portion, from pin's head to walnut; tissue of liver elsewhere normal; capsule thickened with cicatricial puckering	Normal	.. ..	Normal		
Cicatricial loss of substance on surface of liver; abscesses occu- pying upper and outer portions right lobe; numerous isolated foci elsewhere; small deposits near the surface left lobe; the one in connection with lung is situated to left of a large abscess in right lobe	Cicatricial loss of substance of spleen; malpighian corpuscles enlarged, re- act much with iodine. 9½ oz.	.. ..	15½ oz. Soft, cap- sule separable; cortical substance congested, swollen and turgid		

No. of Case.	Age.	Years of Service.	Details of Service in sequence.	Previous History of Disease in sequence.	Where Fatal Lesion contracted.	Duration of Lesion.	Duration of last Hospital Admission.
9	33	13 $\frac{2}{3}$	Home .. 3 $\frac{1}{3}$ India .. 2 $\frac{1}{3}$ Home .. 5 $\frac{1}{3}$ Malta .. 2 $\frac{1}{3}$ India .. 2 $\frac{2}{3}$	Splenitis Acute bronchitis Orchitis Rheumatism Hepatitis	Nusserabad	234 days	2 months 3 days
10	26	7	Home .. 1 Mediterranean 6	1. Febris continua 2. Cirrhosis and Ascites	Malta	6 months	3 months 24 days
11	28	10	Home .. 1 $\frac{1}{3}$ India .. 8 $\frac{1}{3}$	Rheumatism Acute Alcoholism Ague Cirrhosis of liver and Ascites	Ahmednuggur, India	223 days	25 days

Predominant Symptoms characterising last illness.	External Appearance.	Cranium, Spinal Canal and Contents.	Neck, Chest, and Respiratory Organs.
<p>Emaciation; cough and purulent expectoration; dyspeptic symptoms; acute hepatic pain; abdomen swollen and tympanitic. Temperature from 102° to 96° F. Position in bed always on the right side. Latterly diarrhoea. Dullness over the base of right lung, with absence of vesicular breathing</p>	<p>Weight of body, 86 lbs. Extreme emaciation. Cicatrices in right groin, with hardening of lymphatic glands</p>	<p>.. .. .</p>	<p>Miliary enlargement of tracheal glands; base of lungs firmly adherent to diaphragm. The structure of each base is disorganised from the liver lesion, and the left especially is softened and absorbed by the pressure</p>
<p>"Hard-drinker" — usual symptoms.</p>	<p>Chest, 36½ in.; body weight, 134 lbs.</p>	<p>Pia mater vascular; commissural parts diffuent; brain, 2 lb. 13 oz.</p>	<p>Glands enlarged along course of œsophagus; mucous membrane of trachea cyanosed; adhesions of pleuræ; bronchial glands hardened and enlarged; lungs generally soft</p>
<p>Commencing in abdominal enlargement and œdema of lower extremities. Fluid rapidly re-accumulating. Paracentesis 3 times within 63 days, death following last tapping from peritonitis. Habits very intemperate</p>	<p>Weight, 10 st. 9 lbs.; height, 5 ft. 10½ in.; chest girth, 36½ in. Great emaciation; distension of abdomen and thorax; œdema of lower extremities.</p>	<p>Calvarium thickened anteriorly; flattening of convolutions; ventricles distended with serum; brain substance anæmic</p>	<p>Left pleural cavity contained 40 oz. of turbid serum; the membrane covered by recent lymph. In right cavity 38 oz. of clear serum, with old adhesions at the apex and posteriorly; great vascularity of both membranes; lungs shrunk from compression, full of blood, but comparatively empty of air; edges in places carnified</p>

No. of Case— contd.	Heart and Vascular System.	Peritoneal Cavity.	Alimentary Canal.
9	Normal in size; semi-decolorised coagula in the cavities; hard deposit in the aortic coats in the sinus valsalva, and a patch of atheroma, size of a shilling, with central loss of substance, is situated in the anterior wall, about 1½ in. from the valve	.. .. .	Tonsils indurated with remains of ulceration of uvula; extreme vascularity of mucous membrane of the ileum, with oedema of texture. Extensive ulceration in the large gut; ulcers deep, sharp-cut, and vascular — some cicatrising; diphtheritic exudation generally present in the gut
10	Fat on surface; white spot anteriorly; slight degeneration of aorta. Weight, 9½ oz.	Fluid in cavity	Blood vessels of stomach congested; mucous membrane of intestine turgid; solitary glands prominent; vermiform appendix very long
11	White patches on pericardiac surface of the heart anteriorly and posteriorly; decolorized coagulum in right auricle; heart somewhat small, but parts normal, and apertures relatively in proportion to one another	Liver not visible on opening the cavity; 28 oz. of turbid serum; a uniform coating of lymph over the peritoneum	.. .. .

Liver.	Spleen.	Pancreas and Suprarenal Capsules.	Kidneys.	Bladder and Generative Organs.	Joints. Bones, and Muscles.
Right lobe of the liver projects upwards, carrying the diaphragm to the level of the 4th costal cartilage, and the left lobe reaches to the level of the 5th rib; the viscus extending downwards to within three inches of the ilium. Adhesions fix the liver to the surrounding tissues, especially the diaphragm. The right lobe is mainly one large abscess, and in the left is another, bounded by the liver in front and stomach behind. On separating the diaphragm, eight distinct foci of suppuration are exposed. What remains of the viscus is highly congested	Enlarged; firmly adherent to the liver by old adhesions of the thickened capsule. On section fibrine-like deposits are seen, like deposits of purulent formation; glomeruli obvious; slight reaction with iodine in some parts	.. ..	Structure pale and anæmic, cortical portion enlarged. The malpighian corpuscles indicate commencing lardaceous change	Testicles free from deposit, but in one there is atrophy, with increase of connective tissue between the tubules	
3 lbs. 11 oz.; adherent to diaphragm, tuberculated and hobnailed, with some cicatricial loss of substance on upper surface. Section granular, yellow, showing lobules distinctly marked out by connected tissue; lymphatic glands in portal fissure amyloid, general thickening of tissues here around vessels	1 lb. 9 oz.; white spot anteriorly; deeply pigmented, firm and large; amyloid	.. ..	1 lb.; flabby; surface congested; intensely vascular, and capsule adherent.	Number of yellowish white collections in right testicle, size of millet seeds	
Enclosed in a thick capsule, with dense adhesions to the abdominal parietes. Surface extremely irregular, hobnailed, over the left lobe resembling the pitting of small-pox. On section presenting the ordinary characters of cirrhosis, granules varying from a pin's head to a pea, and deeply stained with bile pigment. Dimensions: Transverse, 8.2 in.; thickness, 3.6; antero-post., 5.7; weight, 2 lbs. 10 oz.	Capsule opaque, with fibrinous adhesions dependent from it. On section, slaty-grey in colour, soft; glomeruli not visible. Near the periphery in one point is a fibrinous nodule the size of a cherry stone. Weight 2 lbs. 2 ozs. Malarial.	.. ..	Congested, otherwise normal.		

No. of Case.	Age.	Years of Service.	Details of Service in sequence.	Previous History of Disease in sequence.	Where Fatal Lesion contracted.	Duration of Lesion.	Duration of last Hospital Admission.
12	34	14 $\frac{6}{12}$	Home all the period	Syphilis, Primary Rheumatism, Acute Hæmatemesis Ascites	P	76 days	71 days
13	35	16	Home .. $\frac{4}{12}$ Malta .. $5\frac{4}{12}$ Home .. $7\frac{1}{12}$ India .. 3	Bubo Gonorrhoea Syphilis, Primary Dyspepsia Cirrhosis and ascites	Aden	17 months	3 days
14	17 $\frac{1}{2}$	2 $\frac{2}{12}$	India .. 2 $\frac{2}{12}$	1. Malarial Fever 2. Splenic enlargement	India	2 years and over	54 days

Predominant Symptoms characterizing last illness.	External Appearance.	Cranium, Spinal Canal and Contents.	Neck, Chest, and Respiratory Organs.
Severe pain in abdomen and hæmatemesis after marching, followed by continuous vomiting. Ascites; paracentesis; death 2 days after. Habits intemperate	Weight 9 st. 8 lbs. Height 5 ft. 9 in. Girth 34 in. Emaciation of upper extremities, distension of abdomen; œdema of lower extremities	Cranium generally thickened, especially over the frontal eminences; diploe very vascular; veins of pia mater distended; excess of sub-arachnoid fluid; old adhesions of arachnoid over septum lucidum and between the anterior and middle lobes at the base; brain substance pallid. Specific gravity 1.048	Obliiteration of right pleura from old adhesions; lobes of right lung agglutinated; a few lobules of catarrhal infarction at the base; both organs œdematous. Specific gravity, right .884 " " left .885
Gradual advance of the abdominal distension; twice paracentesis; rapid reaccumulation of fluid after last tapping, and death two days subsequently. Habits temperate	Weight 9 st. 6 lbs. Height 5 ft. 8 in. Girth of chest 35 in. Considerable emaciation of body; cicatrices in both groins; enlargement of right inguinal glands	Pericranium firmly adherent over the right frontal eminence corresponding to a patch of vascularity of the bone, the vessels of which are lardaceous. Frontal eminences thickened with great vascularity of the diploe; patches of opacity of the arachnoid following the larger veins; pachionian glands very much enlarged	Lower portion of chest and costal cartilages expanded from abdominal accumulation; bronchial glands enlarged; trachea and bronchi filled with tenaceous mucus and with great vascularity of the mucous membrane; right lung adherent to pericardium and covered by old lymph agglutinating lobes; on section gorged with blood but crepitant. The apex of left lung gorged, black, non-crepitant; apoplectic; lower lobe normal, with the exception of congestion
Extreme abdominal enlargement. Weight 100 lbs. Pallor extreme; blood watery, and great quantities of white with few red corpuscles; dyspnoea; anasarca	Distension of abdomen	Brain 3 lbs. 2 oz.	Thoracic glands enlarged on each side of aorta; bronchi and lungs congested; œdematous

No. of Case— contd.	Heart and Vascular System.	Peritoneal Cavity.	Alimentary Canal.
12	Laden with fat externally, substance flaccid. Partially decolorized coagulum in right auricle, left ventricle empty. Blood-staining in pulmonary artery and aorta. A few small points of atheroma at the aortic descending curve. A fibrinous nodule at the free edge of the central lappet of aortic valve, and firm lymph on the endocardium immediately beneath it. Heart generally enlarged. Weight 11 oz. Specific gravity 1.022. Diameter of orifices—R. A. V. 1.67 in., L. A. V. 1.32 in. Pulmonary art. 1.18 in. Aorta .91 in.	Distended with amber-coloured fluid; peritoneum opaque and thick from old inflammation; recent lymph over the coils of intestine; liver not visible on opening cavity	Ulceration on the site of tonsil. Basal papillæ of tongue very enlarged. Diphtheritic exudation in the œsophagus from the cricoid cartilage downwards with ecchymosis of mucous membrane. Stomach coated with mucous membrane swollen. Extensive accumulation of fat externally over the intestine. Coats of small intestines swollen. The mucous membrane is intensely vascular, all but black, and manipulated by soft lymph. Towards the lower part of the ileum, for the space of 2 ft., there is a diphtheritic exudation which can be peeled off. This enteritis commences at the duodenum and stops abruptly in the ileum, about 1½ ft. from the valve. Below this the solitary glands are like "sesame grains." The large intestines are thinned and atrophied; the solitary glands are prominent
13	Over the left ventricle anteriorly and over the prominence of pulmonary artery are patches of opaque thickening of the pericardium; walls of right ventricle thinned, and thinning of the coats of the pulmonary artery corresponding to the external patch. Aorta, from origin throughout the thorax, extensively œdematous and blood-stained, with the ascending portion pouched and puckered internally. Near the edge of the mitral valve are nodular thickenings. Dimensions of heart and orifices normal	Distended with fluid of a clear viscid character; recent adhesions between the visceral and parietal peritoneum; old adhesions between the liver, abdominal wall and diaphragm; soft lymph over the coils of small intestines and omentum	Marks of surface ulceration over the centre of the base of the tongue. Cyanotic congestion of the pharynx. Mucous membrane of stomach very vascular over the large curve. Peyer's patches very prominent with ecchymosed spots here and there
14	White spot on pericardium; cavity contains 8 oz. fluid, in which is urea and traces of sugar; cone of pulmonary artery reaches 2nd rib; blood whitish-brown hue, dirty, coffee-ground, coagulum very soft. Measurements: vertical, 5.4 in.; ventricles, 3.9; transverse, 4.4. Diameter of orifices: tricuspid, 1.67; mitral, 1.32; pulmonary, 1.18; aortic, .92. Weight, 10 oz.	Slight fluid in cavity; intestines pushed to the right side.	Substances of intestines atrophied. Peyer's glands atrophied; slight ulcerations in colon, and enlargement of salivary glands.

Liver.	Spleen.	Pancreas and Suprarenal Capsules.	Kidneys.	Bladder and Generative Organs.	Joints, Bones, and Muscles.
<p>Liver entirely mis-shapen from deep furrows, mainly running from before backwards, and causing great nodulation of the surface. All division into lobes obliterated. Some of the furrows are adherent to abdominal walls by old lymph. On section the substance is firm, tough, pale, composed of granules varying from a pin's head to a pea (cirrhotic), and deeply stained with bile pigment; interspersed are dense cicatricial-like strands, with nodules of fibroid tissue and calcareous masses (syphilitic). The gall bladder was coated externally by a thick layer of fat, and contained inspissated bile. Dimensions, transverse, 9.4 in.; thickness 2.7; anteropost., 4.5. Weight 3 lbs. 8 oz. Specific gravity 1.066</p>	<p>Generally enlarged; localized thickening of capsule; substance firm, fleshy, paler than normal. Weight 1 lb. 6 oz.; specific gravity 1.031</p>	..	<p>Stellate congestion on surface; cortical substance, increased; generally pallid</p>		
<p>Liver covered with dense adhesions with portions of omentum and diaphragm attached; left lobe shrivelled up into a mass 2 inches square; right lobe conical and surface furrowed by deep depressions in every direction, and nodulated. On section the tissue is very tough; firm fibrous cicatricial-like bands permeate it in every direction, in amount as great as the liver tissue present. This latter is firm, yellow, granular to the touch. Dense fibrous nodules are still present, and in places are degenerate cretified products of the same. Weight 3 lbs. 2½ oz. Dimensions of right lobe, transverse 7.8 in.; thickness, 3.4; anteropost., 5.4.</p>	<p>Weight 10 oz. Capsule covered with dense fibroid thickenings; on section firm, dark red, granular, glomeruli obvious</p>	..	<p>Capsule not separable without tearing viscus; cortex pale, with slight lardaceous change in some of the vessels</p>		
<p>9 lbs. 10 oz.; 13.7 in. broad by 9.7 in.; congested; white substance without acini; no reaction with iodine; gall bladder empty. Nature of the deposited material same as spleen</p>	<p>10 lbs. 15 oz.; adherent anteriorly to the liver, and descends to limit of true pelvis and anteriorly to middle of right lobe of liver; substance very firm and fleshy; immense development of connective tissue; no acini visible; pulp will not wash out; reddens on exposure; no iodine reaction</p>	<p>Right suprarenal capsule adherent to liver, with cheesy purulent-like contents</p>	<p>Left, 5 oz.; right, 9½; left, concave on anterior aspect, capsule slightly adherent, substance granular, with loss of tissue; right, much softer than left, surface smooth, no loss of substance</p>	..	<p>Bones of skeleton extremely light and much diminished in earthy constituents</p>

No. of Case.	Age.	Years of Service.	Details of Service in sequence.	Previous History of Disease in sequence.	Where Fatal Lesion contracted.	Duration of Lesion.	Duration of last Hospital Admission.
15	25	6 $\frac{1}{2}$	Home .. 2 Cape .. 3 $\frac{1}{2}$ China .. 1	1. Febris Intermittens 2. Syphilis, Primary 3. Asthenia 4. Splenic enlargement 5. Frequent Remittent Fever	China	?	?
16	22	5	Home .. $\frac{7}{8}$ Mediterranean 4 $\frac{1}{4}$	1. Febris Continua 2. Jaundice 3. Hydatids of Liver	Gibraltar	310 days	22 days
17	23	2 $\frac{1}{2}$	Home .. 1 $\frac{7}{8}$ Nova Scotia.. 2 $\frac{1}{4}$	1. Lumbar abscess in left groin 2. Phthisis (lardaceous disease of liver, spleen, and intestines, with parenchymatous inflammation of kidney)	Nova Scotia	?	79 days

Predominant Symptoms characterizing last illness.	External Appearance.	Cranium, Spinal Canal and Contents.	Neck, Chest, and Respiratory Organs.
Extreme emaciation; red corpuscles of blood all but absent; muttering delirium	Weight 114 lbs. Girth 33 inches Colourless state of surface	Brain very anæmic, firm, like white wax; 2 lbs. 10 oz.	Lungs collapsed, healthy, slight œdema of tissue; 2 lbs. 7 oz.
Enlargement of liver; vomiting of hydatids; collapse	Girth of chest 38½ in. Weight 8 st. 9½ lbs.	Brain congested; 3 lbs. 7 oz.	Firm adhesion of left pleura; base of left lung firmly adherent to left lobe of liver; portions of lung surrounding adhesions condensed
Tubercular consolidation of both lungs; pain over 1st and 2nd lumbar vertebræ with great purulent discharge; diarrhœa; albumen in urine; specific gravity 1.020; œdema	Excessive emaciation; œdema of feet; opening of abscess in groin and lumbar region	Bones very vascular, especially anterior part of calvarium; dura and pia mater very vascular, and adherent anteriorly; white substance of brain vascular; specific gravity 1.035	Thoracic glands enlarged and soft; pus in left pleural cavity. Left lung completely disintegrated by small cavities, 2 lbs. 1 oz. Right, consolidated at base with grey, elastic, miliary tubercle elsewhere, 1 lb. 11 oz.

No. of Case— contd.	Heart and Vascular System.	Peritoneal Cavity.	Alimentary Canal.
15	Purpuric ecchymosis of heart's surface; lappets of mitral valve thickened and shortened; lining membrane of aorta rough near sinus; walls of heart thin, anemia of tissue. Weight, 11 oz.; measurements, 5.4 × 4.1 × 4.5 × 11 in.; circumference. Dimensions of orifices: right, 1.45 and 1.18; conus arteriosus, 1.32; left, 1.45 and 1.03	.. .. .	Several eroded black spots in mucous membrane of stomach; valvula conniventes oedematous; intestines very thin and bloodless, stained by bile
16	Serum in pericardium; slight adherent portions of flocculent lymph at apex; texture of heart flabby. Weight, 9 oz.	Large quantity of thin yellow fluid and air; lymph exudation in folds of intestines; oedema of connective tissue; stomach adherent to diaphragm, liver, and colon; mesenteric glands enlarged	In mucous membrane of stomach a communication $\frac{1}{2}$ in. wide, with cyst of liver; a small ulcer, covered by white slough with sharp edges in duodenum, $1\frac{1}{2}$ in. below pyloric orifice, opening into peritoneum; purulent accumulations in connective tissue around stomach
17	.. .. .	.. .. .	Stellate vascularity of stomach; mucous membrane of intestines pale, attenuated, substance greatly thinned, amyloid. Peyer's patches atrophied

Liver.	Spleen.	Pancreas and Suprarenal Capsules.	Kidneys.	Bladder and Generative Organs.	Joints, Bones, and Muscles.
3 lbs. 2 oz.; anæmic; pigmented; fatty	7½ oz.; pigmented; many adhesions to peritoneum	.. ..	11 oz.; anæmic		
Adherent; left lobe reaches 4th rib, and attached by adhesions to left lung; loss of substance of organ; acini in right lobe very distinct, with much pigmentation; firm, especially anteriorly; in right lobe a cavity filled with hydatids and pus, with numerous secondary cysts; in left lobe a large one in same state, communicating with stomach; embryos in abundance, with calcareous degeneration in cyst wall	15½ oz. .. ..	.. ..	15½ oz.; large and flabby; congested; cortical substance increased.		
Swollen and moulded to ribs and right kidney; 6 lbs. 6 oz.; specific gravity 1.052; section translucent, firm, wax-like; cellulose reaction with iodine in most parts, and microscope shows hepatic tissues replaced by a homogeneous, highly refracting substance in irregular masses which have induced atrophy in the liver cells	Enlarged 11½ oz. Amyloid	.. ..	Right 9 oz., left 8 oz.; specific gravity 1.042; substance soft; cortical much swollen and pyramids very vascular; renal epithelium swollen, granular, and opaque, and cortical tubes irregularly distended. Commencing amyloid degeneration in the glomeruli	..	3rd and 4th lumbar vertebrae infiltrated with yellow deposit, softening, with enlargement of vascular spaces; hyperostosis in the vicinity, with small carious particles separating into abscess cavity. Intervertebral substance of 3rd and 4th broken up; 2nd, 3rd, 4th, and 5th, strumous degeneration. Psoas muscles totally disorganized, and sheaths occupied by pus which on left side opens externally

APPENDIX No. XI

CASES.

1. *Case of Enteric Fever, with unusual Complications* By Assistant-Surgeon R. J. Scott, M.B., 62nd Regiment.

Private W. S., 62nd Regiment, age 21, service 8 months, joined at Lucknow, April 1872. Came under observation on 19th April, 1872, complaining of languor, feebleness, and diarrhoea, with loss of flesh. On 27th, active symptoms had apparently subsided, and he was anxious to go to duty, but temperature being 101·8, he was detained.

On the morning of 28th, at 1 A.M., had a sudden attack of diarrhoea, motions copious but natural; at 6 A.M. was in a state of collapse, from which he rallied under diffusible stimuli and hot bath. For next six days he continued in a highly febrile state, with dry, brown, and fissured tongue; pulse 120 to 132; constant straining and diarrhoea; temperature 101 to 103·5.

On 4th May report was, "Passed four bloody stools last night, with violent abdominal pain and straining; in one of the motions was a tubular membrane, which was inverted, about 6 inches long, and which has all the appearance of being an entire portion of small intestine; after passing this the straining ceased; temperature 102·5, pulse 118, very weak; tongue dry and brown; countenance dusky, almost moribund."

From this date his condition continued to improve up to 1 A.M. on 7th May, when he again fell into a state of collapse;—rallied from this, and made fair progress to recovery up to 18th July, when he was declared convalescent.

Remarks.—The tubular membrane passed on the 4th has all the appearance, on careful examination, of being an entire portion of the small intestine. Soon after this tube was passed a microscopic examination revealed a structure closely resembling non-striated muscular fibre. The external surface of this tube had the smooth glossy appearance of the peritoneal covering of the intestine. The interior coating was well marked with numerous ulcers of different sizes, which in some places had nearly perforated the tube. One had completely done so.

Among other interesting points in this case may be noted two well-marked accessions of collapse, the first on the 28th of April, or six days before he passed the membranous tube; the second on the 4th of May, or the day on which he passed it. On both occasions large quantities of stimulants were required, as he appeared to all intents moribund. The symptoms in this case, from first to last, were very obscure; the only safe indications of the progress of the disease were derived from repeated thermometrical observations, which were taken four or five times daily. The man himself, at the commencement of his illness, was inclined to make light of his complaint, declaring himself fit for duty; however, having once ascertained that his temperature was above the normal range, attention was directed to his case. Had it not been for the thermometer, he would have been sent to his duty, as, on the day previous to the first attack of severe prostration, there was no other symptom indicating disease; and had collapse occurred in barracks, nearly a mile from the hospital, it would have proved fatal. In this case the tepid bath, or when he was too weak to be moved, a sheet wrung out of cold water was frequently applied—occasionally six times daily, according as the temperature rose, and always with marked benefit.

The only explanation I can offer why fatal peritonitis did not set in is, that intussusception of the bowel for a length equal to the portion of the intestine passed had first taken place, and that the severe collapse with its accompanying enfeebled circulation favoured the separation, otherwise the bowel contents at that part must have made their way into the abdominal cavity, and

set up fatal peritonitis. The supposition of intus-susception would also account for the portion of bowel passed being turned inside out, and when passed it bore a close resemblance to an entire portion of small intestine, and certainly was much too perfect-looking for a slough.

There was no cutaneous eruption throughout the course of the disease, although frequently looked for, but this is not unusual in India. I have now no doubt that this was a genuine case of enteric fever, as a man was admitted from the same company a few days after, who died on the 14th day of the disease, and at the *post-mortem* examination, Peyer's, and the solitary glands in the lower part of the ileum, presented well-marked pathological appearances of enteric fever.

2. Case of "*Complete Ophthalmoplegia*," with only *Partial Paralysis of the Iris*.
By Inspector-General T. Longmore, C.B.

TOTAL loss of motion of the eyeball is a very rare affection; so much so, that it is not described in some important modern works on ophthalmic diseases. It may therefore be of use to place on record the notes of the following case, which passed through Netley during the present year.

Private J. T., 73rd Regiment, aged 29, of 8 years' service, a stout, well-proportioned, generally healthy-looking man, of temperate habits, was invalided in December, 1871, to Netley from Ceylon, on account of "impaired vision."

Early history.—When between four and five years old, he had an attack of measles. While convalescing from this attack, his right eye became inflamed; and for this ailment he was treated as an out-patient at the Huddersfield Infirmary for several months. The inflammation gradually subsided; but from that time he has been unable to do more than just distinguish light from darkness with the right eye. The left eye was not affected, and its vision remained good.

Military history.—Enlisted in the 73rd Regiment in 1864. The defect of vision of the right eye escaped detection at first, because, according to the man's statement, when his left eye was supposed to be covered by the hand of the examiner, and he was asked to count the test-dots, he saw through the space between two of the fingers of the covering hand. The defect was discovered soon after he joined the regiment, and he was recommended by the surgeon, Dr. Hardie, to be allowed to fire his rifle from the left shoulder. The permission was granted, and he then acquired the use of his rifle without any difficulty. He went with his regiment to Hong-Kong in 1866, and subsequently to Singapore. His only illness during this period was a mild attack of bowel disease. His constitution does not appear to have been ever tainted with syphilis. In 1869 he moved to Ceylon.

History of present ailment.—In June 1870, in Ceylon, he was at ball practice for three weeks. During the practice he fired eighty rounds. On the second day of practice he began to notice some affection of the sight of his left eye, which gradually became more dim. At the end of the three weeks' practice, the glare of the daylight distressed him, and he avoided exposure to it as much as he could. He marched nine miles back to Colombo after the practice, remained there about a month, and then marched to Point-de-Galle. About this time he was frequently disturbed by a sense of dizziness, by black floating spectra, and pain about the frontal and parietal regions. On the 18th of January, 1871, he was admitted into hospital. His sight had now become so impaired that, according to his own account, he could not distinguish a white from a black man. He derived no benefit from the remedies employed, which chiefly consisted of blistering to the temples and behind the ears, administration of iodide of potassium and sarsaparilla, quinine as a tonic, &c. In May 1871, there was complete ptosis of both upper eyelids, and he was so blind that a man was told off to look after him and lead him about. About the month of September following, some improvement in power of sight of his left eye took place, and towards December he became able to raise his eyelids a little. In

December he embarked as an invalid to come to Netley. He was admitted into Netley on April 24, 1872.

Condition on admission.—Partial ptosis of both eyelids, more marked on the left side. With his head erect, the border of the eyelid covers one-half of the right pupil; the left pupil is covered about two lines more than the right. The eyelids can be closed tightly, but cannot be elevated, or very slightly so. There is a slight trace of a convergent squint of the right eye.

Both eyeballs are quite immobile. The patient, though making every effort to do so, cannot direct either eye upwards, downwards, inwards, or outwards, nor in any intermediate direction.

The pupils are permanently slightly dilated, but both irides still act in obedience to the stimulus of light. They dilate further when covered by the hand, and contract when the hand is removed and the eye is exposed to the light. The tension of both eyes is normal; no engorgement of sclerotic or conjunctival vessels. There is no anæsthesia of either cornea; no facial or lingual paralysis.

With the right eye the patient cannot count fingers at any distance. He sees objects as faint shadows; no opacity of media. With the left eye he sees fairly objects in the line of axis of the eye when corrected for myopia. $M = \frac{1}{4}$. No diplopia. Ophthalmoscopic examination is very difficult, owing to the immobility of the eye-balls. In the right eye a patch of choroidal atrophy in the region of the macula lutea is visible, but a fair view of the optic disc could not be obtained. In the left eye the fundus, as far as visible, appears to be normal. The illumination of this eye caused uneasiness and subsequent sense of fatigue.

The patient was watched during sleep. The eye-balls were found to be not turned upwards, as is natural in a state of health during sleep, but, if anything, rather downwards. When walking about, the patient had to move his head on wishing to see any object not straight before his eyes, and he described himself to be in a constant state of uneasiness lest he should strike against objects which might be on either side of him. When laid flat on his back on his ward bed, he did not see the ceiling immediately above him, but only a small portion near the angle formed by it and the wall on the opposite side of the room to where he was lying. While at Netley he was subjected to a course of electric currents (interrupted), one pole being applied to the temple and neighbouring parts, the other to the eyelid and subjacent eyeball. At the same time, strychnia in small doses was administered in infusion of calumba, and a liberal diet with porter was allowed. No improvement in the condition of the eyes followed, though the patient improved in general condition and gained weight.

When a strong current was applied to either eye, it caused a good deal of epiphora, but no movement of the eyeball resulted under its influence.

He left Netley on the 15th July, and went to Honley, near Huddersfield, Yorkshire.

Remarks.—The patient was at first suspected by some observers to be practising deception. Proper examination of his case, however, and more especially the fact of the eyes not being turned up under the eyelids when they were closed in sleep, excluded this supposition.

It was difficult to assign any cause for the general paralysis of the muscles of the eyeballs. There was no history of exposure to cold, rheumatism, syphilis, or of cerebral disease, such as occasionally have appeared to give rise to paralysis, more or less complete, of the eyeball. The action of the sun may have led to vascular congestion and some effusion within the cranium; but the only evidence of such an occurrence beyond the state of the eyeballs was the patient's account of having suffered from occasional dizziness, headache, and ocular spectra. The dimness of vision which the patient noticed while he was at ball practice in Ceylon was probably due to the loss of accommodative power associated with the dilated and inactive state of the pupils dependent on the affection of the third pair of nerves. This was probably much more complete at the early period of attack than it was at the time when the patient was at Netley. A marked peculiarity, indeed, of the case was the fact of the paralysis of the irides being limited to the extent described in the foregoing notes, while the paralysis of the superior, inferior, and internal recti muscles was absolute. The ptosis was also complete for a time while the patient was in Ceylon,

according to the history sent home by the Surgeon in attendance, but was only partial at the time of his arrival at Netley. It is difficult to account satisfactorily for the existence of the incomplete paralysis of the levatores palpebrarum, as well as for the partial responsiveness of the irides to the stimulus of light (persistent dilatation of the pupil being generally one of the earliest indications of impairment of nervous energy of the third pair), with such complete paralysis of all the muscles of the globe of the eye as existed in this case. The only explanation admissible seems to be, that the small amount of nervous energy which had been regained by the third pair of nerves was sufficient to admit of reflex muscular motion of the iris on the optic nerve being stimulated by light, while the same amount was not sufficient to permit excitement into action of the larger muscles of the orbit supplied by the same nerves.

3. *Case of Abscess of the Liver; Extensive Cerebral Lesions without Cerebral Symptoms; Diagnosis Obscure. By Inspector-General W. C. Maclean, M.D., C.B.*

SERGEANT-MAJOR P. B., 98th Regiment, aged 39, 13 years' service, of which, 7 were passed at home and 6 in India, was admitted into the Medical Division of Royal Victoria Hospital, Netley, on the 4th November 1872, the patient having just arrived from Bombay. On admission he was very low and emaciated, and complained of a "burning pain in the stomach," with hiccup and vomiting. There was a painful spot in the epigastric region, so exquisitely tender that he could not bear the smallest pressure. This spot was not larger than half a hand's-breadth, and did not extend into the right hypochondrium. There was some dullness anteriorly at the base of the right lung, but the hepatic dullness did not extend above the sixth intercostal space in the mammary line, or the seventh in the axillary line. The weakness of the patient did not admit of any examination of the posterior surface of the chest. The heart-sounds were distant and feeble, and the pulse was beating so feebly at the wrist that it could not be counted. His temperature was frequently taken, and was never observed above the normal standard. More frequently it was some points of a degree below it. He had no diarrhoea and made no complaint of headache, answering questions clearly. The irritability of stomach was so great that he vomited everything but iced water with a little brandy, of which he retained some from time to time.

Nothing could be more meagre than the information ascertainable about the patient's medical history. He suffered from dysentery, ague, and enlargement of the liver in India; but, so far as could be made out, had been free from dysentery for more than a year before leaving Bombay. The Serjeant-Major was employed as a writer in one of the military offices in Bombay, and, by his own account, was attacked "suddenly" with urgent hepatic symptoms; and as a troop-ship was about to sail for England, *via* the Suez Canal, he was brought before an Invaliding Board and embarked on the same day, arriving at Portsmouth the day before his admission at Netley.

As the patient could retain neither food nor medicine, an attempt was made to sustain him by nutritive enemata, but continuing to sink, he died on the 9th of November.

POST-MORTEM EXAMINATION.

External Appearances.—Great emaciation; slight bulging of the right side of chest compared with the left.

Head.—Calvarium natural; slight congestion of pia mater; subarachnoid effusion, with slight flattening of convolutions; irregularly scattered stellated congestion in spots; slight superficial softening, about the size of a bean, at the posterior part of the left lobe of the cerebrum; general texture of brain firm; cystic development of the right choroid plexus. In the cerebellum is a patch of softening, the size of a nut; similar ones, only smaller, are scattered over the brain, between the sulci of the convolutions, and extending into the grey matter; these were hæmorrhagic-like, and probably embolic. In the corpus

striatum, right side, there is a small one of the same kind. In all the instances the white substance was intact. In a branch of the basilar artery, proceeding towards the softened centre, were long fibrinous clots, white and firm, above half an inch in length; this gave off branches to the smaller vessels. Under the microscope, in the softened masses, some of the capillaries were filled with blood-clots, and dilated; others normal. Mingled with these were numerous recent fibroid tissue-cells.

Thorax.—Apex of right lung attached posteriorly; a little serum in the cavity of left pleura; base of right lung adherent to the diaphragm; glands at root of lungs enlarged.

Right Lung.—In posterior aspect, two inches from apex, is a patch of softening, size of a Barcelona nut, with vascular infarction surrounding it; other smaller ones present elsewhere.

Left Lung.—In apex is a large blood extravasation. Hard depôts of extravasation, softening into abscesses, can be felt scattered elsewhere; between these the tissue is very œdematous.

Pericardium and Heart.—Slight atheroma in descending aorta; apex formed by left ventricle; decolorised coagula in cavities; fatty infiltration is seen at apex, and deposition of fat is observed on surface generally; substance generally very soft; aorta pouched immediately above the valves, and to the right side.

Abdomen.—Stomach: mucous membrane thin. *Small intestines:* atrophy of Peyer's patches; thinning of ilium towards the valve, with considerable pigmentation of Peyer's patches and solitary glands. Large intestines: evidence of great congestion of glands, and of healed ulcers; considerable contraction of gut towards the descending portion of colon.

Liver.—Adherent to diaphragm towards the right of right lobe, and enlarged upwards and to the right side, by an abscess in the posterior part of right lobe; generally diffused congestion of tissue, inter-lobular and extra-lobular; abscess, about 5 inches in diameter, contains thick curdy pus mingled with a large blood-clot; interior flocculent, with no lining membrane, but limited by a zone of congested tissue; wall of abscess superiorly thin, indicating pointing through the lung. Spleen soft.

Kidneys.—Enlargement of cortex; capsule separable; no depôts.

This case presents many points of interest. I had only an opportunity of seeing this patient the day before his death. I have already mentioned the meagre particulars of his case that came before me. The possibility of an abscess of the liver being present had presented itself to my colleagues, Dr. Fyffe, and myself. It was known that he had had dysentery; and the symptoms from which he suffered in Bombay, and for which he was invalided, were, by the man's own account, hepatic. His feeble condition admitted only of an imperfect examination; but this examination, so far as we were able to carry it, did not warrant a positive opinion in that direction—rather, indeed, the contrary. There were no rigors or night sweats; and the absence of any febrile symptom at any part of the day, as evidenced by the thermometer, seemed to negative such a diagnosis. Yet an abscess was present. What was its history? It is clear, from the nature of the contents, that it was of long standing. Was it consequent on the dysentery, which, from the condition of the great intestine and the history of the case, clearly preceded it? It is impossible to give a positive answer to this question. The abscess was single. Abscesses of the liver having a pyæmic origin are rarely, if ever, single. It may be said that although this abscess was single at the time of death, it may have resulted from the coalescing of many: if so, the localization of the pus depôts on so limited an area as the liver was exceptional. In every case of multiple abscess of the liver, consecutive on dysentery, that has come under my observation, the minute abscesses have been much more widely diffused over the gland. The absence of thermometric indications of suppuration in the liver was a very notable feature in this case. The man was in the hospital from the 4th to the 9th of November; and although his temperature was taken often every day, it was more frequently below than above the normal standard. Is this to be accounted for by his feeble condition? I have seen men with liver abscesses reduced as low, but never without a febrile movement at some time of the day, unless the abscess was firmly encysted; but in this case there was no cyst to

cut it off from the rest of the gland, and so prevent it from being a source of irritation to the system, as in some cases reported by me.* Had the extreme state of fatty degeneration to which the heart was reduced anything to do with the low temperature, notwithstanding the existence of such sources of constitutional irritation as the liver abscess, and the presence of the serious cerebral lesions revealed at the *post-mortem* examination? Could the heart in its diseased condition give the usual signs through the circulation? Although the symptoms—at all events, during the last days of his life—pointed to disease of that organ, no lesion of any consequence was found in the stomach. The hiccough and vomiting were therefore due to the irritation of the diaphragm, as the abscess was pressing towards the lung.

The absence of cerebral symptoms, notwithstanding the serious brain lesion, was very remarkable. He had not a symptom, while under observation at Netley, to indicate any mischief in the heart.

This much can be said with some certainty. 1. That the liver abscess, whether or not it had its origin from the diseased intestine, had been long latent, and had probably formed in a silent and insidious way. 2. That the symptoms which appeared in Bombay and led to his being sent home, were due to inflammation of the capsule (perihepatitis), as the abscess was pressing upwards to its intended point of discharge. 3. That the purulent depôts, and hæmorrhagic infarctions in lungs and brain, were secondary to, and had their origin in the suppurating liver.

4. *Fatal Case from Inhalation of Chloroform. By Surgeon J. L. Erskine, M.D., Royal Engineers.*

THE attention of the medical profession having been lately much directed to the administration of anæsthetics, from several deaths having followed the inhalation of chloroform, it may not be out of place to record the loss of a patient from the use of that drug.

Sapper M., Royal Engineers, 30 years of age, 3 years' service, a strong muscular man, was admitted into the Royal Engineer Hospital at Aldershot on 5th June, 1872, with a compound comminuted fracture of both bones of the right leg, about the lower part of the middle third, the result of an accident. It would prove of no interest to give a minute account of the progress of the case: suffice it to say that the bones united after the usual interval, and the lacerated soft textures almost healed, sinuses however remaining, communicating with diseased bone at the seat of fracture. As it was evident that the wound could not heal till the diseased bone was removed, it was decided to attempt this.

On the 23rd September, the general health being very good, and after a careful examination of the cardiac and respiratory organs, the patient was placed on a bed near an open window, and chloroform given by Dr. Don, R.E., to the extent of about one drachm, sprinkled on a piece of lint, which was held over but not close to the nose and mouth, to allow a free admixture of the vapour with the air.

The amount stated was sufficient to bring the patient under the influence of the chloroform, the usual excitement, only to a small extent, being manifested. The inhalation having been discontinued, and the pulse remaining good an incision over the diseased bone was commenced, when Dr. Don, who was watching the patient's condition, called out that the pulse had suddenly failed, and the man fainted; stertorous breathing succeeded.

Cold water dashed in the face, and ammonia applied to the nostrils, roused him from this condition for about a minute, and the respiration became easy, when syncope again occurred, from which he never rallied.

Endeavours to restore animation were persisted in for about half an hour, in which Dr. Don and I were assisted by several Medical Officers.

* Russell Reynolds' "System of Medicine,—Article, Suppurative Inflammation of the Liver."

The means employed were ammonia to the nostrils, turpentine stupes to cardiac region, artificial respiration by Sylvester's method, and a powerful galvanic current to respiratory muscles, region of heart, and to spine, the tongue being carefully kept well forward.

The patient was not under the influence of the chloroform above one minute, when the first failure of the heart's action occurred.

The chloroform was taken from a bottle, some of the contents of which had been previously used, on the last occasion about a month before, when it was necessary to administer upwards of an ounce to a rather debilitated young man before he was placed under its influence.

POST-MORTEM APPEARANCES TWENTY-FOUR HOURS AFTER DEATH.

Lungs, anteriorly, natural in appearance; posteriorly, portions were infarcted, and the bronchial tubes leading to these portions were injected; there was no loss of consistency in the infarcted portions. The trachea was congested.

The *heart* was somewhat larger than natural, and the muscular substance a little flabby; the valves were perfectly healthy. In the right ventricle there was a small patch of organized lymph, about the size of a fourpenny piece. The heart was empty. Weight 12½ ozs.

The *aorta* was abnormally elastic and small; circumference at valves 3 inches, at arch 2 inches.

Liver healthy, with the exception of two capsular nodules.

Spleen and kidneys healthy; the latter slightly congested.

The pharynx was slightly congested, and patches of congestion were seen in the intestines. There was an unusual amount of fat in the abdomen.

At the seat of fracture, callus had been thrown out posteriorly, firmly uniting the broken ends of the tibia, and retaining them in good apposition. Anteriorly, the bones had not united, several sequestræ lying between the ends of the bones having prevented their union. The tibia below the seat of fracture, as far as the ankle-joint, was inflamed and softened; a thin strip of necrosed bone, covered by new, extended its entire length. About two inches from the ankle-joint an abscess had formed in the bone. It was thus apparent that the proposed operation could not have been successful.

The *post-mortem* examination threw little light on the cause of death, the internal organs being healthy, with the exception of the heart, the amount of disease in which was however quite insufficient to account for death.

Dr. Thomas Jones, in the "British Medical Journal" of November 23, 1872, states that, after studying the recorded deaths from chloroform, he considers they may be classed as *avoidable* and *unavoidable*. In the avoidable, death takes place by suspension of the respiration, or by the gradually paralysing influence of the vapour on the heart. In both these modes of death, timely warning is given, such as stertorous breathing, or partial or complete cessation of respiration, with lividity, &c. Should the paralysing influence of the chloroform be gradually exerted on the heart, the condition of the pulse must be noted, and no more chloroform given, if the pulse become intermittent or irregular, or decidedly fail in power, after unconsciousness has taken place.

"The unavoidable deaths are those which happen very rarely, in which, owing to some inexplicable cause (generally attributed to idiosyncrasy), the agent kills almost instantaneously, by its paralysing influence on the heart through the cardiac ganglia."

The opinion formed was that death occurred in this case from paralysis of the heart. Every possible precaution to avert danger having been taken, it can therefore only be concluded that death, however much to be deplored, was "unavoidable."

5. Case of Femoral Aneurism treated by Pressure. By Surgeon-Major Lewis, M.D., Royal Artillery.

GUNNER M. M., 15th Brigade Royal Artillery, aged 30 years, service 10 years, an Irishman, small but wiry, was admitted into hospital at Gibraltar on 9th August, 1871, with a large fusiform aneurism in the right inguinal region, extending from a point about an inch and a half above Poupart's ligament to

about four inches below it. Its greatest breadth was about an inch and a half below the above-named ligament, where it measured transversely close on three inches.

The man stated that about a fortnight before his admission into hospital, while lifting a portable magazine weighing over eight stone, and constructed to be carried by two men, he fancied that he had strained himself slightly, but did not experience any particular pain at the time. About a week afterwards he noticed a swelling in the groin, and as it caused him but little pain or inconvenience, he did not consider it at first of any consequence; but the rapid daily increase in the size of the tumour alarmed him, and he came to hospital. His previous general health had been good. He stated that he had had a local venereal sore in 1860, but that it was not followed by any form of secondary syphilis. The predisposing cause of the aneurism was most probably an atheromatous condition of the artery.

On the 10th August treatment by compression having been determined upon, was commenced; with however, but little hopes of success, as there was but one spot above the aneurism where the pulsation could be controlled—namely, where the artery passes over the pubic bone. The dilation of the artery had, however, actually commenced above this situation, which rendered the probability of success still more remote. The leg having been bandaged from the foot to the groin by means of a flannel roller, Carte's apparatus was applied, gentle pressure being at first adopted, and even that only at intervals. This treatment was continued for three days; but on the instrument getting out of order, digital compression, by means of relays of men, was had recourse to for a day and a night, when, on its becoming irksome to the patient, it was discontinued.

A leaden weight, 4 lbs., of a conical shape, was next used; which, by being pressed downwards against the bone, commanded the flow of blood in the tumour, the pulsation being so strong as to lift the weight at each throb when not pressed down by the hand.

On the 18th August, the eighth day from the commencement of the treatment, all that could be said was that the aneurism had not increased in size: there was no solidification going on, as the sac by pressure could be thoroughly emptied of its contents. On that day, therefore, a heavier weight of lead, 8 lbs., of a sugar-loaf shape, was applied, which, by very slight pressure downwards, completely shut off the circulation from the sac. This weight the man, at his own request, was allowed to manage altogether himself, removing it every fifteen or twenty minutes for about ten minutes, and then re-applying it. The pressure was kept up for a good portion of the night also, as the man, having had the nature of his ailment and the rationale of its treatment fully explained to him, was keenly alive to the necessity of carrying out the instructions given to him. Under this treatment the tumour had, by the end of the month, become considerably solidified, and the pulsation in it more easily controlled. The improvement increased until the 4th of September—the twenty-fifth day from the commencement of the treatment, and the 17th from the application of the 8 lb. weight—when all pulsation suddenly ceased in the artery, the limb becoming numbed, cold, and livid, much to the alarm of the patient. The leg was immediately wrapped in cotton wool, bandaged in flannel, and raised on a pillow. The tumour felt solid and firm, and was quite free from pulsation. It measured six inches in length, and three inches and a half in diameter at its widest part. The thigh over it measured an inch and a half in circumference more than the opposite limb. The temperature of the leg returned by degrees to its natural state, and the lividity and numbness also passed off.

The man is now—February 17, 1872—quite well, with the exception of some weakness and flabbiness of the calf of the leg, together with slight numbness in this situation, caused by active exercise. The tumour is gradually diminishing in size, and feels quite solid. It is somewhat of a triangular shape, with the base above towards Poupart's ligament, and the apex below. It measures two inches in diameter at its base, and remains perfectly free from pulsation.

The above case fully exemplifies the nature of the treatment by com-

pression, whereby a formidable and dangerous operation was avoided by safe and effectual means, fortunately persevered in, although under unpromising circumstances. I feel convinced that the successful termination would not have been attained but for the employment of the 8 lb. weight, Carte's apparatus proving quite useless in the treatment of an aneurism situated so high up: for, let the ball and socket joint be screwed ever so tightly, yet the pad would slip up above the ramus of the pubis, whereas the weight by a gentle pressure downwards answered perfectly; and, besides, the man himself could ease the pressure whenever he pleased without completely removing the weight. I beg, however, to add my humble testimony to the value of Carte's apparatus in popliteal aneurism, three cases of which I have successfully treated by its means.

It will be observed that had ligature of the external iliac artery been resorted to in the above case, the operation would have been followed most probably by fatal results, judging from the effects produced by the arrest of circulation in the artery, even after twenty-five days' compression. This case is also instructive in demonstrating that the amount of pressure necessary to effect the object need not be continuously kept up.

6. Case of Femoral Aneurism treated by Pressure. By Assistant-Surgeon Park, M.D., Royal Artillery.

CORPORAL McC. R.E., was admitted to Herbert Hospital, Woolwich, on 30th January, 1872, with an aneurism situated at a narrow finger's breadth below Poupert's ligament on the right side.

On the 11th February Carte's instrument was fitted on. After some hours of intense pain, latterly with cardiac distress, it was removed when the point of pressure was found to be much inflamed and tender.

On the 13th digital pressure by relays of patients was commenced, but after less than 48 hours it was omitted owing to increased tenderness of the skin over the only point on which it was possible to apply compression.

On the 26th Carte's instrument was again applied and for the same reason as on the former occasion it was removed after three hours' use.

On the 29th, and for some subsequent days, digital pressure by relays of fellow patients was practised during the day, leaving the patient to sleep at night.

On the 5th of March the patient preferred to use an instrument which he had made himself, and which was found to cause perfect compression, with freedom from distress, except at rare intervals. He had whittled a piece of wood into the shape and appearance of a large pestle, there was a notch in the upper end over which he carried a piece of bed-cord, the free ends of which he tied to either side of the iron bedstead. By tightening or slackening this cord the current through the vessel could be modified, and, by his own hand or that of a fellow patient resting on the tip of the instrument, complete arrest of the circulation was produced. By means of this contrivance intermittent pressure was kept up till the 9th. That morning, on the pressure being removed, it was found that all pulsation in the tumour had ceased. Pulsation returned however in a quarter of an hour, and pressure was resumed. On the 10th pulsation had ceased, and, for the first time, there was great pain in the tumour, also much œdema of the limb. Pressure was therefore discontinued, but had recourse to again on the 12th in consequence of a recurrence of pulsation, which however was diminished in strength, as compared to what it had been previously.

Pressure was removed on the 15th, when pulsation seemed to be still further diminished.

It was recommenced on the 19th, and kept up with frequent intervals of rest till the 10th April. During these days it was applied, or removed with the object of depriving the patient at night of as little natural sleep as possible, and of sparing him fatigue; indeed, it may be said that he suffered but little fatigue. One important object in view also was to preserve the one spot of skin from excessive tenderness.

On the 10th April, at 10 A.M., on the occasion of pressure being removed, the aneurism was found to be pulsating nearly as strongly as it was observed to do

on the 15th of March. Pressure not having been re-imposed, it was found at the next examination at 5 P.M. on that day that pulsation had ceased. The patient is now performing the laborious duties of a sapper at the South Kensington Museum.

CLINICAL COMMENTARY.

The most noteworthy point about this case, and perhaps the only one which entitles it to special notice is this, that Carte's instrument having been found to be quite inapplicable, owing, perhaps to a special intolerance of pain, there would have been no surgical resource open to choice excepting ligature of the external iliac with all its grave risks, had it not been for the suggestion of a very simple means of intermittent compression which in due course effected a cure.

The digital pressure which was practised ought to be entirely put out of consideration. Whatever may be effected by this mode, where there are skilled assistants, nothing is to be hoped for from it where the means at hand are such as were employed in this case. Further, it ought to be borne in mind, that, although the treatment was extended over a number of days, that number very much exceeded the period actually embraced by the course of treatment. It ought to be specially noted that the pressure was undoubtedly intermittent in a double sense. It was intermittent because there were frequent intervals of no treatment, owing to the tender state of the skin at the only point at which pressure could be applied, and also from the necessity of giving rest and sleep. It was intermittent also because from the nature of the instrument, being subject to the hand held over it, the pressure of necessity intermitted even on occasions when stringent orders had been given to maintain absolute arrest of the arterial flow. Indeed on one occasion, when such orders had been given, the patient was found looking out of the window with his instrument quite laid aside.

It will have been observed that, when pressure was removed for the last time, pulsation was still present in the tumour, and that, without re-imposed pressure, it was found to have finally ceased in a few hours afterwards. This would seem to indicate that a clot must have become impacted in the mouth of the artery at the distal end of the tumour, and that solid fibrine was then deposited from below upwards.

7. *Fracture of the Base of the Skull and Recovery. Death from results of Intemperance upwards of 11 months afterwards. By J. Balfour Cockburn, M.D., Surgeon, Royal Engineers.*

SAPPER A. D., age 39, service 6 years, native of England, a chemist prior to enlistment. About 9:30 P.M. on the 5th December, 1870, whilst in a state of semi-intoxication, rolled off the verandah at Hargraves Barracks, Gibraltar, and tumbled on to the asphalted pavement below, a fall of some 18 feet. When picked up he was perfectly insensible, bleeding profusely from right ear, and with a contused wound on occipital vertex; pupils contracted; breathing very slow; pulse 54. At 4 A.M. on the 6th, some six hours after the receipt of injury, he vomited one or two clots of blood and a quantity of undigested food, and at 8 A.M. had so far recovered consciousness as to open his eyes when spoken to sharply, and make abortive attempts at a reply. At 9 A.M. urine was passed voluntarily, and the discharge of blood from ear was reduced to a simple oozing. About mid-day he became very restless, tossing over from one side of the bed to the other, keeping the eyelids firmly closed, uttering no sound, and apparently unconscious of everything passing around him. He continued in this state for four days, when a sharp attack of diarrhoea came on, the discharge from the ear became serous-like and slightly offensive, and he now commenced to answer questions rationally at first, but soon lapsing into incoherence, and memory appeared completely in abeyance. The skin over right mastoid process was now greatly ecchymosed, and at one or two points, a boggy or semi-crepitating feel was conveyed to the finger on slight pressure; it was noticed also that he was quite deaf on the right side. On the 13th December, the 8th day after the injury, the discharge from the ear, which had latterly become very offensive, began to diminish in quantity; he could keep up a conversation, but had no recollection of the accident, and his memory generally

was confused and defective. On the 16th December, the 11th day from injury, the discharge from the ear had completely ceased, but the deafness continued. From this date he steadily and rapidly improved, the power of hearing was in a great degree regained; the tympanum, though of a dull, darkish colour, was seen to be intact, and he was fast losing a certain nervous eccentricity of manner for which he had long been remarkable, and which was no doubt in a great measure due to his intemperate habits. On the 7th day of January, 33 days after the accident, he was discharged to his duty feeling, as he stated, with the exception of a slight deafness of right ear, better and stronger than he had been for years. Being a notorious drunkard, and the serious nature of the injury having been pretty clearly diagnosed, the danger of a return to his irregular habits was carefully pointed out to him. Some 14 days after this, he was admitted into hospital with a violent cold and a severe cough. Some cardiac enlargement was now detected, and the existence of an emphysematous condition of both lungs was strongly suspected; in about a month he was sufficiently well to return to his duty. He continued at his duty the whole of a very hot and trying summer, constantly working on the roofs of houses and other heights, and frequently in trouble from *drink* and *absence*. On the 13th September, 1871, he came into hospital with delirium tremens; as he was recovering from this, a febrile attack of a typhoid type, accompanied with much gastric irritation and some cerebral disturbance, supervened. This debilitated him terribly, and as nature attempted to rally, the old cardiac affection became more developed, and this, with increasing indications of pulmonary and hepatic complications, pointed too clearly to a proximate and fatal termination of the case. He died on the 18th of November without a struggle, and sensible to the last.

Post-mortem.—Body slight, but well nourished; dura mater firmly attached to cerebral substance along whole superior border of falx cerebri; cerebral vessels much congested; cerebral substance normal, except the inferior portion of right middle lobe, which was softened and pulpy. Dura mater firmly attached to anterior surface of petrous portion of right temporal bone. On removing the whole middle portion of the basis cranii, the following was discovered:—

Externally, a deep groove running along lower border of superior root of right zygoma and losing itself deeply within the meatus auditorius externus. A gaping fracture of the upper part of the vaginal process, with starring of its external portion; the glaserian fissure being greatly widened, and bridged over by processes of bony growth.

Internally.—The anterior border of the petrous portion of right temporal bone roughened and riddled with minute foramina from base to apex; this line corresponding exactly with the course of the external groove above noted; in a word, it was clear that a fracture had occurred completely separating the mastoid and petrous portions of the right temporal bone from the squamous, and firm re-union had since taken place. A marked difference in size of the two petrous bones existed, the left being larger than the right. Although bristles could be passed without difficulty through some of the foramina along the internal line of fracture into the internal ear, the openings of the aqueductus vestibuli and hiatus Fallopii appeared occluded. On the left side of the skull, *externally*, a wide crack was visible, commencing at the angle of junction of the parietal and temporal bones, as on the right side, but running more directly downwards, and terminating at the posterior and inferior extremity of the tympanic laminae. This fracture was apparently limited to the outer table of the bone.

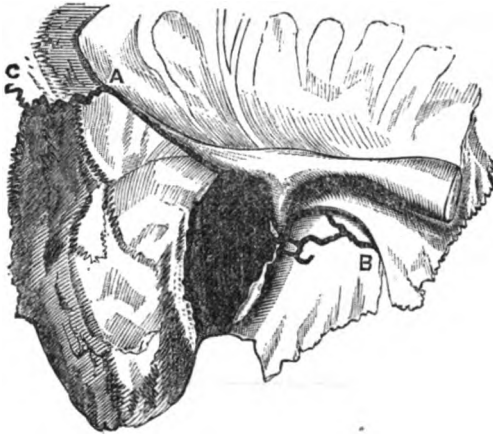
* A preparation of the basis cranii has been forwarded to Netley.

The pericardial sac filled nearly the whole front of the chest; it contained about eight ounces only of red-coloured serum, but the heart itself was enormously hypertrophied, and thickly coated with fat, the muscular structure being very friable, breaking down under the slightest pressure of the finger; valvular structures, normal.

Both lungs extensively emphysematous at apices and anteriorly; at bases and posteriorly much congested and full of frothy mucus. Both kidneys congested and slightly enlarged. The hepatic gland a typical specimen of a nutmeg liver.

** Remarks on the preparation of the Basis Cranii forwarded to Netley, with a sketch of main portion of bones involved. By Staff Assistant-Surgeon Welch, F.R.C.S., Assistant Professor of Pathology.*

THE specimen is a dried preparation of the middle and part of the posterior fossæ of the base of the skull. On the right side the parieto-mastoid suture (A to C) is widened; a fracture across the temporal bone obliquely downwards and inwards passes from the suture at the posterior inferior angle of the parietal bone (A) into the meatus auditorius externus, and from its anterior rim across the glenoid fossa, terminating in the fissure of Glaser (B). The separation of the suture, and the portion of the fracture between the squamous and mastoid bones, are filled in by callus; while that in the glenoid fossa is still an open fissure, with small divergent branches, and in three instances is bridged across by thin bony processes. Internally, corresponding to this outer fracture, is a porous line of bone, with numerous minute foramina, terminating anteriorly in the foramen lacerum anterius. At the centre of the line these foramina communicate with the tympanum. The fracture between the squamous and mastoid on the one hand, and that between the squamous and petrous on the other, follow apparently the original line of coalescence from the separate points of ossificatory development of the temporal bone. As compared with the left, the right petrous portion is atrophied, and the petro-sphenoidal suture partially obliterated by osseous union. On the left side, a line of fracture, involving the external table only, passes from the suture at the corresponding point of the parieto-temporal junction, in a wavy direction downwards, terminating between the mastoid process and the posterior rim of the external auditorius meatus. This fracture is re-united in places only. The basilar process of the sphenoid and the sella turcica show numerous superficial erosions (irritative absorption). The bones of the skull are proportionately thin.



Portion of Right Temporal Bone, the dark ragged line showing the Fracture from A to B, A to C the Suture.

APPENDIX No. XII.

THE ALEXANDER MEMORIAL FUND.

The subject for the next prize essay is—"On the Various Forms of Stricture of the Urethra; their Causes, Consequences, and Treatment." To be illustrated as far as possible by cases drawn from the personal observation of the author.

The essay to be legibly and clearly written, superscribed with a brief motto, and accompanied by a sealed envelope, similarly superscribed, containing the name and address of the author.

Essays to be despatched to the President, Alexander Memorial Fund Committee, Army Medical Department, 6, Whitehall Yard, on or before the 31st December, 1875.

The competition to be limited to Executive Medical Officers of the Army on full pay.

The relative merits of the essays to be determined by assessors to be selected by the committee.

The prize to be awarded to the best essay offered without reference to the number of competitors, provided the writer has complied with the prescribed conditions.

APPENDIX No. XIII.

ARMY MEDICAL SCHOOL, NETLEY.

THE 23rd Session, or Winter Session, of 1871-72, was attended by 3 Surgeons-Major, 7 Surgeons, 17 Assistant-Surgeons of the Army Medical Service, whose names appear in List No. 1, which follows.

There were also present 14 candidates for commissions in the Army Medical Service, and 18 candidates for the Navy Medical Service.

Thirteen of the Assistant-Surgeons went through their examination for promotion at the close of the session.

The order of precedence determined by the combined results of the examinations at London and Netley, and the total number of marks gained by each candidate for the Army Medical Service in the two examinations are shown in List No. 2, which follows.

The Herbert Prize was gained by Mr. E. W. Cottle.

LIST No. I.

Medical Officers who attended the Army Medical School at Netley during the Winter Session 1871-72.

Name.	Rank.
Domenichetti, R., M.D.	Surgeon-Major, Staff.
Fraser, J., M.D.	" 50th Foot.
Franklyn, E. J.	" Royal Horse Artillery.
Gulland, A. D.	Surgeon, Staff.
Halahan, J. H.	" "
Meadows, R. W.	" 68th Foot.
Mould, T. R.	" Staff.
Palatiano, G.	" "
Reid, A.	" 2nd Battalion 16th Foot.
Teevan, T.	" 30th Foot.
Chandler, E.	Assistant-Surgeon, Staff.
Churchill, C. F.	" "
Douglas, O. M.	" "
Fiddes, J. M.	" Royal Artillery.
Hoile, J. M.	" 17th Lancers.
Illingworth, J. A.	" Royal Horse Artillery.
Land, J.	" "
Martin, W. T.	" Staff. " "
Stewart, W. K.	" "
Walker, H.	" "
White, M. L.	" "
Stafford, P. W.	" "
Tyrrell, W. J.	" "
Hensman, H. F.	" 77th Foot.
Mackie, D.	" 2nd Battalion 7th Foot.
Hopkins, E.	" Staff.
Wood, T.	" "

TWENTY-THIRD SESSION, WINTER 1871-72.

LIST No. II.

Combined results of the London Examination in August 1871, and at Netley in February 1872, of candidates for the Army Medical Service.

Order of Merit, as finally settled.	Names.	Total Number of Marks (Maximum, 6,900).	Order of Merit, as finally settled.	Names.	Total Number of Marks (Maximum, 6,900).
1	Cottle, E. W. ..	5,118	8	Edge, J. D. ..	3,866
2	Ash, R. V. ..	4,625	9	Barrow, F. E. ..	3,837
3	Connolly, P. S. ..	4,510	10	Blood, R. ..	3,797
4	Dwyer, C. E. ..	4,447	11	Barrow, H. J. W.	3,703
5	Rogers, J. G. ..	4,445	12	Bridges, W. P. ..	3,695
6	Fasken, W. A. D.	3,993	13	Drury, R. ..	3,694
7	Connolly, B. E. ..	3,927	14	Grant, W. C. ..	3,654

LONDON EXAMINATION, AUGUST 1871.

Candidates for Commissions in the Army and Naval Medical Services.

ANATOMY AND PHYSIOLOGY.

1. The Gastrocnemius and Soleus having been removed, describe the parts brought into view from the upper border of the *popliteus* muscle to the heel, giving also the relative position of the vessels, nerve, and tendons passing behind the inner malleolus.

2. State the peculiarities of the blood in the hepatic, portal, renal, and splenic veins respectively.

3. Describe the intrinsic muscles of the larynx, their relations, attachments and functions. State also the nerves by which they are respectively supplied, and describe particularly the origin, connections, and distribution of the superior laryngeal nerve.

4. What is the condition, as regards ossification of the *femur*, at the time of birth? State the order in which the different epiphyses begin to ossify, and the periods at which they respectively become united to the shaft. Then describe the mode in which a long bone increases in length and in thickness.

SURGERY.

1. Describe the symptoms of incipient scrofulous disease of the hip-joint; in what structure does the disease commence, and what are the progressive changes which occur when the disease runs its course unchecked.

2. Describe the symptoms of dislocation of the head of the femur into the obturator foramen, and the means to be adopted for its reduction.

3. What would be the symptoms of ruptured urethra from a blow on the perineum, and what the measures to be adopted in such an injury?

4. Describe the symptoms, local and general, in a case of strangulated femoral hernia, and the treatment to be adopted after the operation for its relief.

5. Describe the characteristics of a myeloid tumour; in what tissues, and at what period of life does it occur?

6. What would be the probable cause of retention of urine in a man of middle life, and how should such a case be treated?

MEDICINE.

1. What are the principal lesions of the brain which may give rise to paralysis of motion? Give the morbid anatomy of the several kinds of softening.
2. What are the causes and symptoms of ulceration of the larynx? Give carefully the diagnosis of each form, and state how remedies can be applied to the larynx.
3. What are the causes and symptoms of consolidation or deposit in the lung.
4. Enumerate the chief structural changes in diseased livers, and state how you would diagnose a case of cirrhosis.
5. Give the diagnosis and treatment of displacements of the uterus.
6. Give the pharmacopœial preparations, doses, presumed mode of action, and uses in medicine, of digitalis and conium.

NATURAL HISTORY ; PHYSICS ; &c.

Voluntary Examination.

ZOOLOGY.

1. Describe the chief modifications of the structure and development of the teeth in Mammals, and give the general character of the dentition of the several orders.
2. What is the structure of the horns of the different genera of Ruminantia?
3. Give an account of the metamorphosis of Insects, and point out its chief differences in the different orders and parts of the same order.
4. What are the most remarkable characteristics of the Fauna of Australia?

BOTANY.

5. How are plants and animals distinguished from each other?
6. Describe the structure and functions of a leaf.
7. Give the characters of the natural order Leguminosæ, and those of its three suborders.
8. What is Liber? where is it situated in Exogens and Endogens respectively?
9. What are the most remarkable genera and species of the Alpine and maritime Flora of Great Britain? What species are common to both?
10. Describe the vegetative and reproductive organs of the genus Equisetum.

PHYSICS, &c.

11. Of what gases does common air consist, and in what proportion are they present? Give the specific gravity of each.
12. Explain the term Specific Heat.
13. Explain the structure of the eye considered as an optical instrument.
14. What is the nature, and what are the causes of the tides? How is their great variation at different periods and in different places explained?
15. Give a tabular statement of the principal geological formations.

LANGUAGES.

I. FRENCH AND GERMAN.

Conversational examinations in each, with exercises of dictation and translation.

NETLEY EXAMINATION, FEBRUARY 1872.

Held at the close of the 23rd Session.

A. WRITTEN EXAMINATION.

I. MILITARY MEDICINE.

1. Give a definition of epidemic cholera, and a brief sketch of its history.
2. Present a short summary of Bryden's doctrine of its propagation, and give any facts within your knowledge showing that even in India his theory does not always hold good.
3. Explain Pettenkofer's theory, and give any facts with which you are acquainted, showing the influence —
 - (a.) Of elevation above the sea level ;
 - (b.) Of impure air ;
 - (c.) Of impure water ;
 - (d.) Of the movement of troops and pilgrims,
 on the propagation of the disease.
4. What are the facts which point to the intestinal discharges as at least one medium of propagating the disease? Do the fresh discharges appear to act in this way, and what is the evidence on the point?
5. What is the mortality rate in cholera? Is it much affected by climate, or country? Show how it varies at different periods of an epidemic, and the fallacies to which this variation has given rise in estimating the value of treatment.
6. What is the standing order in India when cholera appears in a cantonment, and what has been the general result on the health of the troops?
7. Give the symptoms, under the following heads, and strictly in the following order :—
 - (1.) Of the premonitory stage.
 - (2.) Of that of development, with a careful description of the evacuations.
 - (3.) Of that of collapse, with the temperature of the surface and in the rectum at this stage, with Dr. George Johnson's explanation of the phenomena.
 - (4.) Of that of reaction.
8. Give the prognostic value —
 - (1.) Of uraemia.
 - (2.) Of gastro-enteritis.
 - (3.) Of vomiting of green bilious-looking matter, all in the stage of reaction, and of bloody evacuations at any stage of the disease.
9. Give the treatment —
 - (1.) In the premonitory stage.
 - (2.) In that of development.
 - (3.) In that of collapse.
 - (4.) In that of reaction.
10. When is opium of service? when dangerous?
 Show what is the result from experience in India of the so-called eliminative or purging plan of treatment?

 What is the result of hot saline injections?
 What of free stimulation with alcohol?
 What of large doses of calomel?

II. PATHOLOGY.

1. Give the names of such local lesions as will include the more important forms of local diseases which affect the various organs.
2. Give the names of the round or hollow worms which infect the human subject. State the part of the body where each is found, and the means of preventing their occurrence.

3. Describe the lesion known as atheroma, the sites of its occurrence, how it is brought about, and what this lesion tends to, or may result in.

4. The last *post-mortem* examination was made in a case of secondary syphilis in an invalid of the 15th Regiment.

- (a.) State the evolution of the disease from the original sore to death, the immediate cause of death, and its *post-mortem* elucidation.
- (b.) Enumerate the lesions observed in the body, arranging them under the headings of "specific" and "non-specific." Describe each of the specific lesions in their anatomical details, and state your reasons for considering them as specific.

III. MILITARY HYGIENE.

1. What are the chief points to which you would direct your attention in examining whether the ground, round and under any habitation, is likely to be injurious to health?

2. What are the causes of the impurity of air in inhabited houses? State the general principles of ventilation, the amount of air necessary per head per hour, and the best means of ascertaining that the proper standard of purity is maintained.

3. What amount of truth is there in the doctrine of acclimatization? State in general terms the mortality, according to age, of European soldiers in hot, as compared with temperate, climates, and mention the chief diseases which cause the mortality among the older soldiers in the Bengal Presidency.

4. How would you endeavour to prevent outbreaks of typhus, dysentery, and malarial diseases?

IV. MILITARY SURGERY.

1. A soldier is brought to you with a penetrating gunshot wound of the abdomen.

(a.) What symptoms would you consider to be diagnostic of penetration of the stomach, liver, small or large intestines, or of any portion of the urinary organs having occurred in the case?

(b.) If you are in doubt as to any visceral lesion having occurred, what would be the course of treatment you would adopt in the case?

2. A soldier is only able to read Snellen's 20 feet type at 10 feet.

To what causes may his inability to read the type at its full distance be due?

In what way do you determine to which of these causes the inability is attributable?

3. You are requested to enter in the usual ward case-book the case of an invalid disabled by the effects of an unreduced dislocation of the elbow-joint.

Mention (a) the order in which you would write out the history of the case, (b) to what points in the history you would give special attention, and (c) what objects you would keep in view when trying to elucidate the particular points you may name in your reply to Section b.

B. PRACTICAL EXAMINATION.

PATHOLOGY.

(Three hours allowed.)

1. Examine the portions of tissue placed in the dishes. State of what organ each is a part, and describe its morbid condition.

2. In the preparations numbered 1, 2, 3, 4, 5, and 6, define anatomically what parts are shown, and describe the lesion or lesions which are illustrated in each.

3. Determine the magnifying power of any one of the microscopes, and append the scale used.

4. Describe and name generally, what you see in the fluid contained in the test tubes, examined under the highest power.

5. Name each of the preparations placed under the microscopes on the table.

MILITARY HYGIENE.*(Three hours allowed.)*

1. Examine the sample of water placed before you,—as much as can be done in the time.
2. Examine the contents of the packet before you, chemically and microscopically.
3. Read the meteorological instruments before you, and apply the necessary corrections.

MILITARY MEDICINE AND SURGERY.**I. MEDICINE.***(Twenty minutes for examination.)*

Examine the case of—

Write concisely a history of the case,—your diagnosis, prognosis, the probable effects of treatment, and the influence of the disease (or injury) on the man's fitness to service as a soldier.

*(Thirty minutes allowed for this description.)***2. SURGERY.***(One hour allowed.)*

Examine preparation No. _____, as far as you can without handling it.

State what it is; the nature of the injury the bone has sustained, the probable symptoms which followed the injury, and the treatment you would adopt if a similar injury occurred in a case under your care.

THE EXAMINATION OF ASSISTANT-SURGEON FOR PROMOTION, held at the close of the 23rd Session, was the same as the Netley Examination for Candidates which has been detailed above, with the following additional questions, viz. :—

Hernia—

- (a.) What are the distinguishing signs of a reducible hernia?
- (b.) What is meant by incarceration, and what by strangulation of a hernial protrusion?
- (c.) What are the signs of incarceration, and what of strangulation?
- (d.) Describe the anatomical differences between an oblique and a direct inguinal hernia.
- (e.) When a case of inguinal hernia is presented to you, by what observations do you determine it to be oblique or direct?
- (f.) In operating by cutting for the relief of a strangulated oblique inguinal hernia, what are the several structures which you have to cut through?

The 24th Session of the Army Medical School, held during the summer of 1872, was attended by 12 candidates for commissions in the Army Medical Service, 40 candidates for the Indian Medical Service, and 18 for the Naval Medical Service.

The order of precedence, determined by the combined results of the examinations at London and Netley, and the total number of marks gained by each candidate for the Army Medical Service in the two examinations are shown in the list which follows.

The Herbert Prize was gained by Mr. W. R. Murphy, Indian Medical Service; the name of Mr. A. Crombie stood at the head of the list, but he

was ineligible to take this prize a second time, he having previously obtained it in the summer of 1871, when a candidate for a commission in the Army Medical Service, which he was afterwards allowed to exchange for a commission in the Indian Medical Service.

TWENTY-FOURTH SESSION, SUMMER 1872.

Combined results of the London Examination in February, and at Netley in August 1872, of candidates for the Army Medical Service.

Order of Merit, as finally settled.	Names.	Total Number of Marks (Maximum, 6,900).	Order of Merit, as finally settled.	Names.	Total Number of Marks (Maximum, 6,900).
1	Magill, J. ..	5,304	7	Tincler, B. M. ..	3,870
2	O'Donnell, R. W. ..	4,411	8	Slaughter, W. B. ..	3,711
3	Donovan, W. ..	4,388	9	Browne, A. L. ..	3,700
4	Swayne, C. H. ..	4,201	10	Keys, C. W. M. ..	3,537
5	Brown, D. B. ..	3,907	11	Bushe, C. J. L. ..	3,385
6	Quill, R. H. ..	3,885	12	Stokes, H. H. ..	3,122

LONDON EXAMINATION, FEBRUARY 1872.

Candidates for Commissions in Army, Navy, and Indian Medical Services.

ANATOMY AND PATHOLOGY.

1. Name the bones which enter into the formation of the orbit, stating their relative position in its walls; then give the foramina opening into the orbit and the parts passing through them.

2. Describe the position, relations, and connections of the otic ganglion; and give the dissection required to display them.

3. The *Lumbar Plexus*.—Its situation, relations, the nerves constituting it, and their arrangement in it; then give the nerves proceeding from it, in the order in which they come off from above downwards, with the course and distribution of each.

4. Describe the minute structure of the spleen, and state the peculiarities of the blood in the splenic vein.

5. Give an account of what is known respecting the structure, nature, and properties of the *red* and of the *white* corpuscles of the blood.

MEDICINE.

1. What is usually meant by the term "contagion"? Enumerate the diseases which are said to be contagious, and mention the chief reasons which are supposed to justify the application of the term "contagious" to them.

2. Describe a case of locomotor ataxy and one of progressive muscular atrophy or wasting palsy.

3. Describe the symptoms and state the various causes of the following conditions of the heart:—(a) displacement of the heart to the right side, (b) displacement of the heart downwards (c) great hypertrophy and dilatation of the left ventricle, (d) hypertrophy and dilatation of the right ventricle.

4. Describe the characters, causes, and treatment of non-malignant ulcer of the stomach.

5. For what purposes are iodine and bromine, and their salts, used in medicine? What are the chief pharmacopœial preparations?

6. Describe at length the course of investigation you would adopt if you were called upon to examine a patient suspected of being pregnant, but who refused to give any information. Enumerate in this answer the usual causes of amenorrhoea and of enlargement of the abdomen simulating pregnancy.

SURGERY.

1. Describe the symptoms of concussion of the brain, what evil consequences may follow on such a condition, and what should be the treatment adopted?

2. What pathological changes would be observed in a patient who has died from the effects of an old stricture of the urethra?

3. Describe the symptoms of carbuncle; in what parts does it most frequently occur; and what are the constitutional conditions often observed with it? What treatment, local and constitutional, should be adopted?

4. Enumerate the different forms of eruption commonly observed in syphilitic patients; by what symptoms may the specific character of such eruptions be diagnosed?

5. A boy was stabbed with a penknife immediately behind the angle of the jaw; the wound was followed by arterial hæmorrhage, which recurred and continued whenever pressure was removed; state what treatment should be adopted in such a case?

6. Describe the symptoms by which an irreducible inguinal hernia may be diagnosed from a hydrocele, a hæmatocele, and a tumour involving the testicle.

NATURAL HISTORY; PHYSICS, &c.

Voluntary Examination.

ZOOLOGY.

1. Give the characters of marsupial mammals, pointing out their chief points of difference from other mammals. What is their geographical distribution?

2. Describe the chief modifications of the organs of respiration in animals.

3. What are the characters of cephalopoda?

4. What are the principal subdivisions of the class pisces? Give their principal distinctive characters.

5. What are the most characteristic features of the fauna of Africa?

BOTANY.

6. Give the essential characters of ranunculaceæ and rosaceæ, pointing out in what respects they agree and in what they differ.

7. Describe the different kinds of inflorescence in plants.

8. Give an account of the circulation of the sap and its causes.

9. Describe the reproductive and vegetative organs of the genus marchantia.

10. How does climate affect the flora of Great Britain and Ireland? Name some of the most local species, and indicate in what counties they are found.

PHYSICS, &c.

11. What are trade winds? Where do they occur? To what causes are they owing, and in what direction do they blow?

12. Explain the meaning of the following terms:—Distillation, fermentation, condensation, evaporation, radiation, polarization.

13. Explain the construction of the thermometer, and describe the different kinds used, stating the countries which adopt each. How would you reduce the degrees of one scale to those of the others?

14. Describe the structure of glaciers, and the mode of their formation. What traces of their action are found on the earth when they are not found?

LANGUAGES.

I. FRENCH AND GERMAN.

Conversational examinations in each, with exercises of dictation and translation.

NETLEY EXAMINATION, AUGUST 1872.

Held at the close of the 24th Session.

A. WRITTEN EXAMINATION.

I. MILITARY HYGIENE.

1. What are the methods of examining air? What amount of air should be given per hour to a healthy man? On what principle is this rule based, and how is the amount attempted to be given in barracks in England?

2. What is the usual length of marches? What are the circumstances during marches which add to the fatigue, and what are the usual duties of Medical Officers on the line of march?

3. What are the principal diseases causing mortality among Europeans in India? What measures have been adopted to lessen these diseases?

4. What are the chief conditions in war, which are likely to cause sickness among soldiers? How would you deal with these conditions, and what precautionary measures would you take against the chief epidemic diseases which attack troops on active service?

II. PATHOLOGY.

1. Name the forms of destructive diseases of the lungs given in the nomenclature of the College of Physicians, and of the first nine cases of phthisis dissected this session. State—

- (a.) The circumstances in each case upon which the disease supervened;
- (b.) The anatomical conditions of the lungs as to the form of phthisis; and

- (c.) The presence or absence of tubercle in each case.

2. Describe the lesions in the aorta which give rise to aneurism, and what were the morbid conditions in each of the cases of aortic aneurism dissected this session.

3. A case of paralysis in an invalid from India.—Private M'N., aged 34 years, with 14 years' service, was the subject of *post-mortem* examination on 24th April, 1872. Give a connected account of the pathology of the case under the following heads:—

- (a.) The medical history showing the nature of the precursory diseases leading up to and influencing the paralysis.
- (b.) The symptoms of the paralysis as indicating its nature, and pointing to the locality of the lesion; the peculiarity of its course, and special organs of sense involved.
- (c.) The extent of lesion seen in the nerve centres and parts therewith connected.
- (d.) The extent and kind of lesions seen in other parts of the body.
- (e.) Connect the lesions seen after death with the paralytic symptoms during life, and explain their mutual bearings, and connect the other local lesions in the body with their symptoms during life.

MILITARY SURGERY.

Question 1. Suppose that you are called upon to give surgical aid at the first line of assistance to the wounded from a field of battle, to what points of practice will you chiefly turn your attention before sending the wounded men away to the field hospitals in rear. Particularise in your reply—

- (1.) Your treatment for shock ; hæmorrhage according to its source and degree ; and for the principal accidents requiring primary help, to which men wounded in action are liable.
- (2.) The provisional dressings and appliances proper to be used on such occasions.
- (3.) The matters which it would be your duty to regulate for the protection and welfare of your patients when seeing them placed on the transport vehicles for removal.

Question 2.—Hypermetropia and Presbyopia. Explain—

- (a.) The difference between the two conditions ;
- (b.) The mode of detecting them and of determining the degree in which each exists ;
- (c.) The mode of correcting them.

(Memo).—Assume some particular degree of Hypermetropia and Presbyopia for illustrating your reply.)

Question 3.—Six patients, each with a gunshot wound of the upper extremity, are placed in hospital under your charge. Three of them are wounds of joints, viz. (a) shoulder, (b) elbow, (c) wrist ; the remaining three are fractures of shafts of bones, viz. : (d) humerus, (e) radius and ulna, and (f) metacarpal bones of the middle and ring fingers. The principal blood-vessels and nerves have escaped division. With this exception, assume any condition of each of the six wounds in succession you may choose, and then describe the treatment you would adopt for it, and your reasons for the treatment.

IV. MILITARY MEDICINE.

1. Give the most complete account you can of the poisonous substance to which we give the name of malaria. Describe the morbid conditions it causes in the solids and fluids of the human system, and contrast the difference in the action of this poison with that which causes the acute exanthemata or other contagious diseases.
2. Describe the symptoms and course of intermittent fever in its severest form, the anatomical conditions it leaves behind, and the treatment including prophylaxis.
3. Give the etiology of epidemic dysentery, the symptoms and course of the disease, and briefly, the treatment in the acute and chronic stages.

B. PRACTICAL EXAMINATION.

PATHOLOGY.

(Three hours allowed.)

1. Examine the portions of tissue placed in the dishes. State of what organ each is a part, and describe its morbid condition.
2. In the preparations numbered 1, 2, 3, 4, 5, and 6, define anatomically what parts are shown, and describe the lesion or lesions which are illustrated in each.
3. Determine the magnifying power of any one of the microscopes, and append the scale used.
4. Describe and name generally, what you see in the fluid contained in the test tubes, examined under the highest power.
5. Name each of the preparations placed under the microscopes on the table.

MILITARY HYGIENE.

(Three hours allowed.)

1. Examine the sample of water before you,—as much as can be done in the time.

2. Examine the contents of the packet before you, chemically and microscopically.

3. Read the meteorological instruments before you, and apply the necessary corrections.

MILITARY MEDICINE AND SURGERY.

1. MEDICINE.

(Twenty minutes for examination.)

Examine the case of—

Write concisely a history of the case,—your diagnosis, prognosis, the probable effects of treatment, and the influence of the disease (or injury) on the man's fitness to serve as a soldier.

(Thirty minutes allowed for this description.)

2. SURGERY.

(One hour allowed.)

Examine preparation No. _____, as far as you can without handling it.

State what it is; the nature of the injury the bone has sustained, the probable symptoms which followed the injury, and the treatment you would adopt if a similar injury occurred in a case under your care.

EXAMINATION OF ASSISTANT-SURGEONS FOR PROMOTION.

(Questions sent to Stations.)

January 1872.

MILITARY MEDICINE.

1. Describe the geographical limits (*habitat*) of true yellow fever. Describe the disease under the following heads:—

(a.) Causes.

(b.) Symptoms.

(c.) Diagnosis.

(d.) Morbid anatomy.

(e.) Prevention with reference to the well-known habits of the disease.

(f.) Treatment.

2. What are the causes which in your opinion tend to the genesis of pulmonary phthisis in the army? Give the result of your observations *post-mortem* on the question of the extent to which the destruction of lung tissue, to which we apply the term "*phthisis*" is due to tuberculosis.

3. What are the diseases in which the subcutaneous injection of morphia is most useful? What are the inconveniences and dangers to be guarded against in the use of this remedy, and what the strength of the solution you would employ.

SURGERY AND SURGICAL ANATOMY.

1. *Traumatic Tetanus*:—

A. Give a description of the course usually followed by this disease when it supervenes on a gunshot wound.

- B. What is understood by the terms :—*Trismus, emprosthotonos, pleurosthotonos, and opisthotonos*?
- C. What circumstances appear to favour the occurrence of traumatic tetanus?
- D. What remedies have appeared to exert most influence on this disease?

2. *Venesection at the fore part of the elbow :—*

- A. Describe the steps of this proceeding.
- B. What points have to be kept in view as regards the arterial and venous circulation of the forearm when the bandage is applied above the elbow?
- C. What purpose is aimed at in causing the patient to grasp an object tightly with his hand?
- D. What vein at the bend of the elbow has a branch of the musculo-cutaneous nerve beneath it, and what vein the humeral artery?
- E. What evils have occasionally resulted from the operation of venesection?
- F. What steps should be taken in case of accidental puncture of the humeral artery?
- G. Explain the state of the various parts involved in the following diseased conditions :—(a) aneurismal varix ; (b) circumscribed aneurism ; (c) diffused aneurism, when they have resulted from the accident named under section F, and mention how they require to be severally treated.

3. *Dislocation of the lower jaw :—*

- A. In what direction does this dislocation take place?
- B. How is it to be reduced?

4. Describe the surgical operations about the foot, known as Hey's, Chopart's, Syme's, and Pirogoff's amputations.

HYGIENE.

1. What duties do the Medical Regulations impose on Medical Officers of Regiments in respect of inspection of barracks? How should the air of a barrack-room be examined for impurities?
2. What are the points of importance to be attended to in the inspection of meat, bread, and flour?
3. What are the duties of a Sanitary Officer of Camps?

PATHOLOGY.

1. Name the several forms of disorders of the intellect required to be identified according to the Medical Regulations, or in accordance with the recent nomenclature of the College of Physicians?
2. Give an account of the pathology of *melancholia* in the following details :—
 - (a.) The earliest mental and bodily phenomena which indicate the disorder
 - (b.) The characteristic appearances of the patient and his general symptoms.
 - (c.) Name the several well-known forms of the disorder.
 - (d.) Describe the course to which the cases of this disorder tend.
3. Describe the nature and appearances of the disease known as "*granular eyelids*," or "*granular ophthalmia*."

APPENDIX No. XIV.

CIRCULARS, GENERAL ORDERS, &c.,

HAVING REFERENCE TO THE MEDICAL DEPARTMENT, FROM 1ST MARCH, 1872,
TO 6th MARCH, 1873.

1st.—ARMY CIRCULARS.

I. *Forage for Horses of Non-Combatants.*

Clause 135.

1st August.

1. The number of horses for which Non-Combatant Officers are entitled to draw forage, or the allowance in lieu thereof, is as follows :—

Rank of the Officers.	At Home. Horses.	Aboard. Horses.
<i>Control Department</i>		
Controller	3	2
Deputy Controller	2	2
Assistant Controller	1	1
Commissary, when in charge of supplies	1	1
<i>Medical Staff.</i>		
Inspector-General	3	3
Deputy Inspector-General	2	2
Surgeon-Major	1	1
Surgeon	1	1
<i>Veterinary Staff.</i>		
Principal Veterinary Surgeon	2	..
Veterinary Surgeon	2	2
<i>Cavalry.</i>		
Riding Master	2	2
Surgeon-Major	2	2
Surgeon	2	2
Assistant Surgeon	2	2
Veterinary Surgeon	2	2
Paymaster	2	1
Quartermaster	2	2
<i>Horse Brigade, Royal Artillery.</i>		
Surgeon-Major or Surgeon	2	2
Assistant Surgeon	2	2
Veterinary Surgeon	2	2
Paymaster	1	1
Quartermaster	1	2

Rank of the Officers.	At Home.	Abroad.
	Horses.	Horses.
<i>Field and Garrison Brigades, Royal Artillery.</i>		
Surgeon-Major or Surgeon	1	1
Veterinary Surgeon	2	2
Quartermaster	1	1
Assistant Surgeon (Field Brigade only)	1	1
<i>Royal Engineers.</i>		
Surgeon-Major or Surgeon	1	1
Assistant Surgeon (only when attached to mounted men of Royal Engineers)	1	1
<i>Infantry.</i>		
Surgeon-Major or Surgeon	1	1
Quartermaster .. .. .	..	1

2. The number of horses specified above is the highest for which each rank of officer may draw forage or the allowance in lieu; and forage or the money allowance will not, in any case whatever, be drawn for more than the effective horses which the officer shall actually keep, as shown by the certificate upon honour, in the terms required by Clause 126, Army Circulars 1869 (see W. O Form 68). This clause will not, however, affect officers drawing for a greater number of horses under the special sanction of the Secretary of State.

3. The foregoing regulations will be strictly enforced from the 1st August, 1872, at home, and from the first day of the month succeeding the date of receipt at each foreign station.

Forage for Horses of Non-Combatants (Assistant Surgeons, Field Brigade,
R.A.)

Clause 158.

1st October.

The grant to an Assistant Surgeon, Field Brigade, Royal Artillery, of Forage, or an allowance in lieu thereof, for a horse, either at home or abroad, notified in Paragraph 1, Clause 135, Army Circulars, 1872, is cancelled.

II. *Commuted Allowance in lieu of Fuel and Light at Home.*

Clause 157.

1st October.

1. The rates of commuted allowance in lieu of fuel and Light are as follows:—

A.—STAFF, DEPARTMENTAL, OR EDUCATIONAL OFFICERS.

Relative Army Rank.	Staff, Departmental, or Educational Appointment.	No. of Rooms for which Fuel and Light are provided.	Daily.	
			Winter, 1 November to 30 April.	Summer, 1 May to 31 October.
			s. d.	s. d.
As Major-Gen.	Inspector-General, Musketry... ..	6	3 0	2 0
	Controller			
	Inspector-General, Hospitals, after 3 years... ..			
„ Brigr.-Gen.	Deputy Adjutant-General, Dublin	5	2 6	1 9
	Deputy Quartermaster-General, Dublin			
	Inspector-General, Hospitals, under 3 years' service			
„ Colonel.	Deputy Adjutant-General, not at Head-Quarters, or Dublin	4	2 0	1 6
	Deputy Quartermaster-General, not at Head-Quarters, or Dublin			
	Deputy-Controller			
„ Lieut.-Col.	Deputy Inspector-General, Hospitals, after 5 years	4	2 0	1 0
	Chaplain, 1st Class			
	Commandant and Chief Instructor, School of Musketry			
„ Major.	Commandant and Superintendent, School of Gunnery ...	3	1 6	1 0
	Principal Veterinary Surgeon			
	Assistant Adjutant-General, not at Head-Quarters			
„ Captain.	Assistant Quartermaster-General, not at Head-Quarters...	3	1 6	1 0
	Military Secretary to a General Officer			
	Chief Instructor of Musketry			
„ Major.	Assistant Controller	3	1 6	1 0
	Deputy Inspector-General, Hospitals, under 5 years			
	Chaplain, 2nd Class			
„ Major.	Chief Instructor, School of Gunnery	3	1 6	1 0
	Director of Gymnastics			
	Surgeon-Major			
„ Major.	Assistant Military Secretary, if a subaltern Field Officer, where there is no Military Secretary	3	1 6	1 0
	Superintendent of Garrison Instructors			
	Commissary			
„ Major.	Chaplain, 3rd Class	3	1 6	1 0
	Deputy Judge Advocate, if commissioned as such			
	Governor, Military Prison, 1st Class... ..			
„ Major.	Surgeon not attached to a Regiment	3	1 6	1 0
	Staff Veterinary Surgeon			
	Assistant Military Secretary, if a Captain, where there is no Military Secretary			
„ Major.	Acting Assistant Controller	3	1 6	1 0
	Control Paymaster			
	Deputy-Assistant Adjutant-General not at Head-Quarters			
„ Major.	Deputy-Assistant Quartermr. General not at Head-Qrs...	3	1 6	1 0
	Assistant Military Secretary, where there is a Mil. Sec. ...			
	Major of Brigade			
„ Major.	Brigade-Major, School of Gunnery	3	1 6	1 0
	Garrison Instructor			
	Captain Instructor, School of Musketry			
„ Major.	Aide-de-Camp	3	1 6	1 0
	Chaplain, 4th Class			
	Deputy Commissary			
„ Major.	Deputy Control Paymaster	3	1 6	1 0
	Assistant Surgeon, 6 years' service, not attached to a Regiment			
	Veterinary Surgeon, 1st Class, not attached to a Regiment			
„ Major.	Staff Officer of Pensioners, if above Lieutenant	3	1 6	1 0
	Provost Marshal, if so commissioned... ..			
	Town or Fort Major			
„ Major.	Governor, Military Prison, 2nd and 3rd Class	3	1 6	1 0
	District Instructor of Musketry			
	Apothecary, after 15 years			

A.—Staff, Departmental, or Educational Officers—*continued.*

Relative Army Rank.	Staff, Departmental, or Educational Appointment.	No. of Rooms for which Fuel and Light are provided.	Daily.	
			Winter, 1 November to 30 April.	Summer, 1 May to 31 October.
			s. d.	s. d.
As Lieutenants.	Assistant Commissary	2	1 0	1 0
	Assistant Control Paymaster			
	Assistant Surgeon, under 6 years, not attached to a Regiment			
	Apothecary, under 15 years			
	Deputy Provost-Marshal, if so commissioned			
	Town or Fort Adjutant			
	Garrison Quartermaster			
" Ensigns.	Lieutenant Assistant Instructor, School of Musketry	2	1 0	1 0
	Veterinary Surgeon, not attached to a Regiment			
	Staff Officers of Pensioners, if below rank of Captain			
	Superintending Schoolmaster			
	Acting Veterinary Surgeon			

B.—REGIMENTAL OFFICERS.

2. The rates granted to Regimental Officers,—

- (a) For married officers who, with the sanction of their Commanding Officer, have elected to live in lodgings when there was sufficient accommodation for them in barracks, and who are consequently not entitled to draw the lodging allowance ;
- (b) For officers entitled to issues, but living in government buildings outside the barracks ;
- (c) For officers' messes and the Paymaster's office when the allowance has been sanctioned and claimed on account of no accommodation being available in barracks,—

are as follows :—

	No. of Rooms for which Fuel and Light are provided.	Daily.	
		Winter, 1 November to 30 April.	Summer, 1 May to 31 October.
		s. d.	s. d.
Field Officer Commanding a Regiment or Battalion, Cavalry Depôt, or Depôt Battalion, Colonels Royal Artillery in Command, Lieut.-Colonels R.A. on pay of that rank, and Lieut.-Colonels on Major's pay or in independent command of two or more Batteries	3	1 6	1 0
Other Field Officers	2	1 0	1 0
Surgeon-Major and Surgeon			
Paymaster after 15 years' full-pay service as Commissioned Officer, with not less than 10 as Paymaster	1	0 6	0 6
Captain			
Assistant Surgeon, after 6 years' full-pay service	1	0 6	0 6
Paymaster, not holding honorary rank of Major			
Instructor of Musketry and Regimental Instructor			
Subaltern			
Adjutant	1	0 6	0 6
Quartermaster			
Assistant Surgeon, under 6 years' service			
Veterinary Surgeon			
Riding Master			

B.—Regimental Officers—*continued*.

										Winter, 1 November to 30 April.	Summer, 1 May to 31 October.
										Weekly.	Weekly.
										s. d.	s. d.
Officers' Mess for a whole Regiment.										9 0	6 0
Paymaster's Office										2 6	NIL.
<i>Pensioners' Establishment.</i>											
Serjeants										1 3	1 3
Store										1 0	0 6
Office										2 0	NIL.

3. No issue of fuel or light (either in kind or money) will be admissible for any room in barracks occupied by the Commanding Officer on account of his regimental duties, distinct from the orderly-room.

4. The commuted allowance for fuel and light will not be paid to officers in receipt of lodging money, or occupying public quarters where fuel and light in kind are issued.

5. Clause 87, Army Circulars 1871, so far as the number of rooms for which fuel and light are allowed, and the rates of commuted allowance at home are concerned, is hereby cancelled.

Royal Warrant—Army Medical Department.

VICTORIA R.

Clause 22.

1st March, 1873.

Whereas We have been pleased to approve of regulations for the Medical Service of Our Army.

Our will and pleasure is that on and after the date of this Warrant, the following rules shall be established for the future admission, promotion, and retirement, and the pay, half-pay, relative rank and allowances of the Medical Officers of Our Army, and that by these rules Our Commander-in-Chief shall govern himself in recommending officers for admission, promotion, and retirement.

2. The following articles of Our Royal Warrant of 27th December, 1870, are hereby cancelled,—viz., 112, so far as it applies to Medical Officers, 334 to 359, 498, and 1,007 to 1013; likewise such portions of our Royal Warrants of 23rd October, 1854, and 1st October, 1858, as are still in force.

3. The ranks and rates of pay of the officers of the Army Medical Department shall be as follows:—

				Daily.	Charge Pay.
				£ s. d.	
Surgeon-General	..	..	..	2 0 0	The Principal Medical
After 25 years' service	..	..	..	2 5 0	Officer of an Army in the
" 30 "	..	..	..	2 7 0	Field, consisting of
" 35 "	..	..	..	2 10 0	10,000 men and upwards,
Deputy Surgeon-General	..	..	..	1 10 0	1l. daily; of 5,000 men
After 25 years' service	..	..	..	1 12 0	and upwards, 15s. daily;
" 30 "	..	..	..	1 15 0	of less than 5,000, 10s.
" 35 "	..	..	..	1 17 0	daily.
Surgeon-Major	..	..	..	0 17 6	Or the Principal
After 15 years' service	..	..	..	1 0 0	Medical Officer of a
" 20 "	..	..	..	1 4 0	Colony where the num-
" 25 "	..	..	..	1 7 0	ber of Commissioned
Surgeon, on appointment	..	..	..	0 10 0	Officers and enlisted men
After 5 years' service	..	..	..	0 12 6	is 1,500 and upwards, 5s.
" 10 "	..	..	..	0 15 0	daily.

4. The relative rank of the officers of the Army Medical Department shall be as follows :—

- I. A Surgeon-General shall rank as a Brigadier-General, according to the date of his commission ; if with an army in the field or after three years' full-pay service as Surgeon-General, he shall rank as Major-General from the date of his joining such army in the field, or according to the date of the completion of such service.
- II. A Deputy Surgeon-General shall rank as Lieutenant-Colonel, according to the date of his commission ; after five years' full-pay service as Deputy Surgeon-General, he shall rank as Colonel, according to the date of the completion of such service.
- III. A Surgeon-Major shall rank as Major, according to the date of his commission ; after 20 years' full-pay service as Surgeon and Surgeon-Major, he shall rank as Lieutenant-Colonel, but junior of the latter rank.
- IV. A Surgeon shall rank as Lieutenant, according to the date of his commission ; and, after six years' full-pay service, as Captain, according to the date of the completion of such service.

5. The relative rank of these officers shall regulate choice of quarters, rates of lodging money, servants, fuel and light, or allowances in their stead, detention and prize-money, as well as allowances granted on account of wounds or injuries received in action, and pensions and allowances to widows and families ; except that in the case of Medical Officers attached to regiments their choice of quarters shall be according to their regimental seniority.

6. Forage shall be granted to officers of the Army Medical Department for such number of horses as are necessarily kept by them for duty.

7. Inspectors-General of Hospitals and Deputy Inspectors-General of Hospitals now serving, or who being now on half-pay shall hereafter be called upon to serve, shall be styled Surgeons-General and Deputy Surgeons-General respectively.

8. Surgeons now serving, or who being now on half-pay shall hereafter be called upon to serve, shall be styled Surgeons-Major ; and Assistant Surgeons similarly circumstanced shall be styled Surgeons.

9. Every candidate for appointment to the Army Medical Department shall possess two diplomas or licences, one to practice medicine and the other surgery in Great Britain or Ireland, and be registered under the Medical Act in force at the time of his appointment. Before receiving a commission, the candidate shall pass an examination in military medicine, surgery, hygiene, and pathology, after attending the authorized probationary course at a general military hospital.

10. Successful candidates shall have their commissions antedated to include the period of their probation, but such antedates shall not carry back pay. Candidates shall receive from the date of joining the general military hospital, and up to the time of leaving it, 5s. a-day. Successful candidates shall be entitled to the full-pay of Surgeon from the date of their passing the examination.

11. A Surgeon shall pass such examination as our Secretary of State may require, before he can be promoted to the rank of Surgeon-Major.

12. A vacancy in the rank of Surgeon-Major, occasioned by death or promotion shall, unless it be expedient that it be otherwise filled, be given to the senior qualified Surgeon of the department. If a vacancy shall arise from any other cause it shall be filled by a qualified Surgeon, who shall be recommended to us by our Commander-in-Chief, with the approval of our Secretary of State.

13. In cases of distinguished service, a Surgeon, if qualified, may be promoted to the rank of Surgeon-Major without reference to seniority ; and in such cases, the recommendation detailing the services for which the officer is proposed for promotion shall be published in the general orders of the army, and in the gazette in which such promotion shall appear.

14. Surgeons serving in India may be granted local rank as Surgeon-Major after 12 years' service.

15. The Medical Officer attached to a regiment or battalion shall remain with it as a rule for five years.

16. All promotion from the rank of Surgeon-Major to that of Deputy Surgeon-General, and from the rank of Deputy Surgeon-General to that of Surgeon-General, shall be given for ability and merit upon the selection of Our Commander-in-Chief, with the approval of Our Secretary of State; and the grounds of such selection shall be stated to Us in writing, and recorded in the department. In all such cases the amount of regimental service, and the amount of foreign service shall be expressly stated.

17. A Medical Officer retiring after full-pay service of twenty-five years and upwards, may, if recommended for the same by the head of his department, receive a step of honorary rank, but without any consequent increase of half-pay.

18. Good service pensions shall be awarded to the most meritorious officers of the Army Medical Department, under such regulations as shall be from time to time determined by Us, with the advice of Our Secretary of State.

19. Six of the most meritorious officers of the Army Medical Department shall be named Our Honorary Physicians, and six Our Honorary Surgeons.

20. Medical Officers shall have a right to retire on half-pay after 20 years' service. Medical Officers of the rank of Surgeon-Major or Surgeon shall be placed on the retired list at the age of 55, and all Surgeons-General and Deputy Surgeons-General at the age of 65 years; unless in any special case it would be for the good of Our service that the officer should continue in employment.

21. Our Secretary of State may, when he shall deem it fit, employ Medical Officers on the half-pay list in special situations at such daily rates of pay, in addition to half-pay, as he shall from time to time determine; but such officers shall vacate their appointments on attaining the age of 65 years.

22. A Medical Officer who having voluntarily resigned his commission, has subsequently been permitted to re-enter the Department shall not, except under very special circumstances, to be approved by Our Secretary of State, be allowed to reckon his former service.

Service on the West Coast of Africa.

23. Service of Medical Officers upon the West Coast of Africa shall be voluntary, except for those who enter the department, especially for African service.

24. Each year or portion of a year shall be allowed to reckon double towards retirement, but not towards increased pay, provided that the officer shall serve at least 12 months on the West Coast of Africa.

25. For each year's service on the coast, a Medical Officer shall be entitled to a year's leave at home, and for every additional period beyond a year he shall have an equivalent extension of leave.

26. Officers who may enter the Army Medical Department expressly for service on the West Coast of Africa, and those who may volunteer for that service from the general department, after the date of this Warrant, shall receive double pay while actually serving on the Coast.

27. Officers who enter the Department expressly for service on the West Coast of Africa shall pass the same examination as other Medical Officers, but they may be admitted at a later age. They will be required to complete three years' actual service on the Coast, after which they shall be eligible for general service. If it shall be certified by a Medical Board that any such officer is unfit for further duty on the West Coast of Africa he may be employed elsewhere, notwithstanding that he may have served for less than three years on the Coast.

Non-Effective Pay.

28. A Medical Officer placed on half-pay by reduction of establishment, or on the report of a Medical Board in consequence of wounds or ill health, caused

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in and by the discharge of his duties, or on account of age (under Article 20), shall be entitled to half-pay in accordance with the following scale :—

				Daily.		
				£	s.	d.
Surgeon-General, after 30 years' service	..	..	..	1	17	6
" " 25 "	..	..	..	1	13	6
" " 20 "	..	..	..	1	10	0
Deputy Surgeon-General, after 30 years' service	..	..	..	1	5	6
" " 25 "	..	..	..	1	2	6
" " 20 "	..	..	..	1	1	0
Surgeon-Major, after 25 years' service	..	..	..	1	0	0
" " 20 "	..	..	..	0	16	6
" " 15 "	..	..	..	0	13	6
" " 10 "	..	..	..	0	11	0
Surgeon, after 10 years' service	..	..	..	0	10	0
" " 5 "	..	..	..	0	8	0
" under 5 "	..	..	..	0	6	0

29. The rate of half-pay awarded to Officers retiring for their own convenience, after 20 years' service on full-pay, under Article 20, shall not exceed one-half of their full-pay at the time of retirement.

30. Every Medical Officer who shall retire after a service upon full-pay of 25 years, shall be granted a rate of half-pay equal to seven-tenths of the daily pay he may have been in receipt of when thus retiring on half-pay, provided he shall have served three years in his rank, or shall have served abroad for ten years in all ranks, or for five years with an army in the field. An officer of 25 years' full-pay service, whose service falls within neither of these conditions, shall be entitled to only seven-tenths of the daily pay he was in receipt of prior to his last promotion.

31. A Medical Officer placed on half-pay from any other cause shall be allowed only a temporary rate of half-pay (not exceeding the rates specified in Article 28) for such period and at such rate as Our Secretary of State for War shall decide with reference to the services rendered to the public by such officer.

32. Medical Officers of 20 years' full-pay service, placed temporary on half-pay on account of ill-health, may, however, be allowed to retire on permanent half-pay, at the rate fixed by Article 28, if after one year on half-pay they shall be reported by a Medical Board to be permanently unfit for further service.

Provisional Arrangements.

33. Until Our further pleasure shall be made known, nothing contained in this Warrant shall be held to change the existing system of promotion of the Medical Officers of our regiments of Household Troops.

34. Surgeons who, previous to the date of this Warrant, entered the Department expressly for service on the West Coast of Africa, and who are borne on a separate list for promotion, shall be eligible for transfer to the general list, on the completion of the third or any subsequent tour on the Coast, provided they shall have performed their duties to the satisfaction of Our Secretary of State, and shall have passed the required examination, after attending the Army Medical School.

35. A Medical Officer appointed before the date of this Warrant, and promoted while serving on the West Coast of Africa, may, on the completion of three successive tours of service, each of 12 months, in the rank of Surgeon-Major on the Coast, be transferred to the general list.

36. A Medical Officer removed from the African service under the conditions laid down in Articles 34 and 35 shall join the general service according to the date of his actual commission.

37. The regulations contained in Articles 34 to 36 shall not apply to Medical Officers who are not of European descent.

38. Any officer serving as Apothecary to the Forces at the date of this Warrant, shall continue to draw the pay and allowances, and to enjoy the

privileges, granted to him by our Warrants of 23rd October, 1854, and 27th December, 1870.

Given at Our Court at Buckingham Palace, this 1st day of March, 1873, in the 36th year of Our reign.

By Her Majesty's Command,
EDWARD CARDWELL.

Clause 23. Royal Warrant—Army Hospital Corps.

VICTORIA R.

1st March.

Whereas it has been represented to Us that it is expedient that Our Army Hospital Corps be organized for extended duties in connection with the Hospital Service of Our Army.

Our will and pleasure is, that Our Warrants of 1st August, 1857, and 27th September, 1861, and Articles 740 to 743, 1138, and 1139, of Our Warrant of 27th December, 1870, be cancelled, and that this present Warrant be the sole and standing authority on the matters therein treated of.

2. In matters of discipline our Army Hospital Corps shall be subject to the orders of the local military authority, but in all other respects it shall be under the direction and control of the Principal Medical Officer at a station.

3. The officers, non-commissioned officers, and men of Our Army Hospital Corps shall be liable to be employed on any duties which they may be called upon to undertake, either in peace or war, in connection with or pertaining to the Hospital Services of Our Army. When with an army in the field they shall be available for service with the field ambulances, as well as for other duties.

4. The officers and non-commissioned officers of Our Army Hospital Corps shall have authority to command not only the men of their own corps, but also the patients in military hospitals, and such non-commissioned officers and men as may be attached thereto, without their own officers for hospital duty.

5. The officers and non-commissioned officers of Our Army Hospital Corps shall take rank with the officers and non-commissioned officers of other corps of Our Army, and wear the ordinary distinctions and badges of such rank on their uniforms, with such other distinguishing badges as may be special to the corps; but it is to be understood that this privilege gives them no command whatever, except over patients in hospital, and officers or men immediately attached to hospital establishments. When any question of command arises the Senior Combatant Officer on the spot shall command.

6. The ranks of officers of Our Army Hospital Corps shall be as follows :—

Captain of Orderlies,
Lieutenant of Orderlies.

7. The relative rank in Our Army of these officers shall be Captain and Lieutenant respectively, and shall regulate their quarters and allowances (except forage allowance), pensions for wounds and pensions and allowances to their wives and families.

8. The ranks of officers in Our Army Hospital Corps shall be filled by Captains of Orderlies, and Apothecaries to Our Forces, who may volunteer for service in the corps. On future vacancies all appointments of officers shall be made by selection from the non-commissioned officers of the corps, except under special circumstances.

9. An officer shall be selected by Our Commander-in-Chief to act as Staff Officer of the corps. The Staff Officer shall be charged with the preservation of the records of the corps, and such duties attaching to the rank of Quartermaster as are to be performed at head-quarters.

10. At out-stations the duties of Quartermaster shall be performed by the officers of the corps as part of their ordinary duties.

11. Until the organization of the corps shall be completed, it shall consist of the non-commissioned officers and men serving in it at the date of this Our Warrant, and also of volunteers from the non-commissioned officers and men of other corps of Our Army.

12. After the organization of the corps shall have been completed, its ranks shall be filled by non-commissioned officers or soldiers volunteering from the ranks of Our Army, or by recruits whose direct enlistment may be authorized by Our Secretary of State.

13. Volunteers from other corps for service in Our Army Hospital Corps shall not, as a general rule, be above 30 years of age, and shall have such length of service as shall from time to time be fixed by Our Commander-in-Chief. They shall in all cases be of good character, able to read and write, and be recommended by their Commanding Officer for their special qualifications and general aptitude.

14. Except in the case of men joining from the Regimental Hospital Establishment of other corps, before the organization of the Army Hospital Corps is completed, volunteers shall serve on probation for a period not exceeding six months, and at the expiration of that time, or sooner if considered advisable, shall be either transferred to the Army Hospital Corps or remanded to their regiments.

15. All men of Our Army Hospital Corps who are of good character, efficient in every way, fitted for their various duties, and within the authorized age, shall be eligible for re-enlistment or re-engagement or extension of army service in Our Army Hospital Corps, or transfer to the Army Reserve under such special regulations as may be made from time to time by Our Secretary of State.

16. Non-commissioned officers or men of Our Army Hospital Corps, transferred from other corps of Our Army, may, if at home, on the representation of the Director-General of the Medical Department of Our Army, or if abroad, on the representation of the Principal or Senior Medical Officer, be re-transferred on account of misconduct, unfitness, or any other cause, to their former, or to any other corps on the order of Our Commander-in-Chief, or any officer duly authorized by him; and such non-commissioned officers or men shall revert to the rank they held in their corps previously to joining the Army Hospital Corps, unless in the meantime they be reduced to a lower rank; in either case they shall be supernumerary to the rank in the corps to which they are remanded.

17. Non-commissioned officers or men enlisted into or re-engaged for Our Army Hospital Corps who may misconduct themselves, or have proved themselves careless, inefficient, and unfitted for their duties may, on a representation of the fact being made by the Director-General of the Medical Department of Our Army to Our Commander-in-Chief, if the non-commissioned officer or man be serving at home, be discharged from Our service. If the non-commissioned officer or man be serving abroad, he may (on the representation of the Principal or Senior Medical Officer) be dealt with, under the authority of the General or other officer commanding Our troops at the station, in such manner as he may consider best for the good of Our service until such period as an opportunity offers for sending him home for discharge.

PAY.

Ordinary Pay.

18. The daily rates of pay of the officers, non-commissioned officers and orderlies of Our Army Hospital Corps shall be as follows:—

	s.	d.
Captain of Orderlies	10	0
Lieutenant of Orderlies, on Appointment	6	6
" " after 5 years	8	6
Serjeant-Major	4	4
Colour-Serjeant	3	4
Serjeant	2	4
Corporal	1	8
Second Corporal	1	5
Private and Bugler	1	2

19. Men of Our Army Hospital Corps shall be entitled to good-conduct pay, under the provisions of Articles 911 to 949 of Our Royal Warrant of 27th December, 1870, which govern the issue of good-conduct pay to Our Army generally.

20. Apothecaries to Our Forces and Captains of Orderlies who may be transferred to Our Army Hospital Corps, shall be allowed to retain, should they prefer to do so, the rank and rates of pay and allowances to which they are entitled at the date of transfer, and they shall be granted all increase of rank, pay and allowances, which may accrue to them for future service, in accordance with the conditions of Our Warrant under which they held their commissions at the date of transfer.

Extra-Duty Pay.

21. The Captain of Orderlies acting as Staff Officer of Our Army Hospital Corps shall receive extra-duty pay at the daily rate of 6s.; in addition to his ordinary pay, while in performance of the duties of Staff Officer.

22. Soldiers of Our Army Hospital Corps employed in the following appointments shall receive extra-duty pay at the following rates, in addition to their ordinary pay, but men employed in a double capacity shall not receive more than one of the rates of extra-duty pay enumerated.

	Daily.	
	s.	d.
Clerks.		
A Non-commissioned Officer (under the rank of Colour-Sergeant), or Private employed in a Medical Office	1	5
Compounders of Medicine and Mortuary Orderlies.		
A Non-commissioned Officer who shall have passed the required examination employed in dispensing medicines, and whose enjoyment has been approved by the Director-General of Our Army Medical Department	1	0
A Corporal, Second Corporal, or Private employed in the Mortuary of a General Hospital where such special appointment has been approved.	1	0
Barbers, Lamplighters, Gas Turncocks, Water Turncocks, Cooks, and Assistants to Cooks, and Gardeners.		
A Second Corporal or Private acting in either of the above capacities	0	2
Attendants on Lunatics.		
Colour-Sergeants employed in a Lunatic Asylum	1	6
Sergeants ditto	0	6
A Second Corporal or Private employed in attendance on lunatic patients	0	3

23. The extra-duty pay to clerks shall be issued only at stations where Our Secretary of State has authorized their employment. It shall not be allowed to non-commissioned officers or orderlies for office work appertaining to their ordinary duties.

Stoppages.

24. No stoppages for rations shall be made from the pay of non-commissioned officers and men of Our Army Hospital Corps, unless they are under punishment which does not entail forfeiture of pay, but which involves the non-performance of their hospital or other duties, in which case a daily stoppage of 8d. shall be made. Soldiers on probation shall pay for their ration a daily stoppage of 4d. at home (beer money being allowed), and 3d. abroad. If admitted into hospital as patients during such probation, they shall be subject to the regulated hospital stoppages of other soldiers of Our Army.

ALLOWANCES.

25. The allowances of the officers of Our Army Hospital Corps shall be regulated by their relative rank. (See Article 7.) They shall not be granted contingent allowance.

26. Officers appointed from the ranks under Article 8 shall be allowed 100% in aid of their outfit as Commissioned Officers.

27. Non-commissioned officers and men of Our Army Hospital Corps shall be entitled to clothing, lodging, fuel and light, or allowance in lieu of lodging, fuel and light, according to their military rank.

28. They shall each be entitled, except while imprisoned or on furlough, to receive the daily ration of a soldier in hospital on full diet, whenever it is practicable to furnish such diet; but in the event of their becoming patients in hospital they shall each be supplied with the class of diet applicable to their cases. Soldiers on probation shall be entitled to the same scale of diet as non-commissioned officers and men of the corps.

29. Non-commissioned officers and men of Our Army Hospital Corps shall not be entitled to any allowance for beer money.

30. Whenever it is not practicable to furnish the non-commissioned officers and men of Our Army Hospital Corps with a full hospital diet, they shall each, if possible, be supplied from the public stores with a ration as nearly as possible equivalent thereto. When they cannot draw rations from the public stores, whether on board ship or on shore, they shall each receive a money allowance of 8*d.* a-day in lieu of a free ration. When any man is in confinement for any offence, he shall be provided with the usual prison diet. When under other punishment he shall, if practicable, receive the usual hospital ration, or an equivalent thereto, subject to the stoppage prescribed by Article 24 in the case of punishment involving the non-performance of duty.

31. Non-commissioned officers and men of Our Army Hospital Corps when on the march, under route, in the pursuance of public duty, shall have the same allowances for marching money and hot meals charged for them as for other soldiers on the march, and in such case they shall not be entitled to rations, but shall receive, in addition to such marching allowance, the money allowance of 8*d.* laid down in Article 30.

HALF-PAY AND PENSIONS.

Half-Pay of Officers.

32. Officers of Our Army Hospital Corps, should their services be dispensed with on reduction of establishment, on account of age (Article 35) or in consequence of ill-health caused by wounds, or brought on in the discharge of their duties, shall be entitled to half-pay at the following daily rates :—

	After 30 years' total Service, 10 years of them as a Com- missioned Officer.	After 25 years' total Service, 5 years of them as a Com- missioned Officer.
	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>
Captain of Orderlies. . . .	10 0	7 6
Lieutenant of Orderlies	8 0	5 6

33. Officers of Our Army Hospital Corps shall have an unqualified right to retire after a total service in all ranks of 30 years, and, if not qualified to receive half-pay in accordance with the scale above laid down, they shall be entitled to receive half-pay at the rate of seven-tenths of the daily pay they were in receipt of at the date of retiring, provided they have served five years in the rank of a commissioned officer.

34. Officers of Our Army Hospital Corps on retiring shall, if recommended by Our Commander-in-Chief, receive the honorary rank of Captain.

35. Retirement shall be compulsory at the age of 55 years, unless in any special case it would be for the good of Our Service that the officer should continue in employment.

36. In cases other than those provided for in Articles 32 and 33 of this Our

Warrant, Our Secretary of State may grant such a rate of half-pay as he may deem proper, taking into consideration the length and character of the services rendered by the officer.

37. Apothecaries and Captains of Orderlies who may have volunteered for Our Army Hospital Corps shall be entitled, should they prefer it, to claim retirement and half-pay on the conditions of Our Warrants under which they held their commissions at the date of their transfer.

Pensions of Non-Commissioned Officers and Men.

38. Non-commissioned officers and men of Our Army Hospital Corps shall be entitled to pensions as laid down for combatants in Part II, Division II, Section 2, of Our Warrant of 27th December, 1870, under the following classification :—

Serjeant-Major in Class I.
 Colour-Serjeant in Class III.
 Serjeant in Class IV.
 Corporal and Second Corporal in Class V.
 Private and Bugler in Class VI.

39. Non-commissioned officers and men at present serving in Our Army Hospital Corps shall be entitled, should they prefer it, to pension, &c., as laid down in Articles 1138 and 1139 of Our Warrant of 27th December, 1870.

40. Non-commissioned officers and men of Our Army Hospital Corps who shall become disabled by disease or injury contracted on duty in the service, shall have their cases specially considered by Our Secretary of State, with a view to a pension being awarded them proportionate to the disability, without reference to length of service.

41. On all points not detailed or provided for in this Our Warrant, the officers, non-commissioned officers and men of Our Army Hospital Corps shall be subject to the same rules and regulations as other corps of Our Army.

Given at Our Court at Buckingham Palace, this 1st day of March, 1873, in the 36th year of Our reign.

By Her Majesty's Command,

EDWARD CARDWELL.

Clause 44.

1st April, 1873.

Duties in Connection with Hospitals.

1. Military hospitals will in future be organized and administered either as—

- (a) General hospitals, or
- (b) Station or field hospitals.

2. Subject to the supreme authority of the Governor or Commandant of the Hospital, of the General or other officer in command of the troops, the internal administration of all military hospitals will be under the control of the officers of the Army Medical Department.

3. In general hospitals the Governor or Commandant will continue to perform the duties assigned to him by the Medical Regulations.

4. The Army Hospital Corps will be organized to form a service for the performance of all subordinate hospital duties, under the orders of the officers of the Medical Department and under the control of the Director-General of the Army Medical Department. A Royal Warrant regulating the pay, non-effective pay, and allowances of the Army Hospital Corps was issued in the Army Circular of the 1st instant.

5. The hospital services hitherto provided for in the Medical and Purveyors' Regulations will be distributed according to the following general principles :—

- (a) The Medical Department will be responsible for the proper direction and use of all the stores and supplies delivered for hospital service, and also for foreseeing and making timely requisitions for the wants of the hospital.
- (b) The Control Department will be responsible for obtaining and delivering at each hospital the necessary stores and supplies upon receiving a demand from the Medical Officer in charge.
- (c) The Royal Engineer Department will be responsible for the general supervision and maintenance of the buildings and fixtures of hospital buildings.

The details will be arranged as laid down in the following paragraphs.

6. The Medical Department will be responsible for the following, in addition to their present duties :—

- (a) For making requisitions for repairs to buildings, roads, fences, and grounds, for whitewashing, and such other services as are to be performed by the Royal Engineer Department.
- (b) For the charge of all equipment in use, including tents and tent equipage when required for hospital purposes, and for whatever further equipment it may be necessary to keep in order to meet the varying wants of the hospital by the daily increase or decrease of patients.
- (c) For keeping gardens and grounds in order.
- (d) For the cleanliness of kitchens, ablution rooms, &c., and such out-buildings as are necessarily connected with the working of the interior economy of the hospital.
- (e) For ordering the due removal of latrine, cesspool, and other refuse, and for certifying that these and other sanitary services, whether performed by contractors or otherwise, together with the sweeping of chimneys, have been duly performed.
- (f) For making timely requisition for fuel, light, provisions, medical comforts, cleaning articles, and all requisite supplies, equipment, and stationery, and for the custody of all such supplies on delivery at the hospital.
- (g) For the cooking and expenditure of diets, and medical comforts, and for the expenditure of water, fuel, gas, and other light, cleaning articles, and all stores, and for making timely representation to the proper authorities of any defect in quality or deficiency in quantity of such stores.
- (h) For such abstracts and vouchers of the expenditure of stores and supplies as may be directed by regulation.
- (i) For the preparation of stoppage accounts for men treated in hospital.
- (k) For the custody of men's kits and personal effects while in hospital.
- (l) For the custody of books in hospital, library, or reading room, and for their issue to patients.
- (m) For preparing the wills of patients when requested to do so.
- (n) For the requisitions for exchange of foul for clean linen, bedding, clothing, and such other stores as the Medical Officer may require; and, where washing is sent direct to the contractors by desire of the Control Department, for certifying to the service having been performed.
- (o) For making timely requisition for transport.

7. The Control Department will be responsible—

- (a) For the provision of buildings necessarily hired for hospital purposes, or for the supply of marquees and tents, and other accommodation required for the sick.
- (b) For the supply of the equipment of such hospitals in accordance with the authorized scales, and for maintaining the equipment in a proper state of repair, also for washing, whether by contract or in laundries, and for the custody of all reserves of equipment.

- (c) For the supply of tools and all other requisites for keeping the gardens and grounds in order, except labour.
- (d) For the removal of refuse, the emptying of latrines, cesspools, and ash-pits, and the sweeping of chimneys.
- (e) For the supply of water, when transport is requisite.
- (f) For the supply of fuel and light, provisions (including meat from abattoirs and bread from Government bakeries), medical comforts, disinfectants, and articles for sanitary purposes, either from Contractors or from Store, and for the custody of all reserves of fuel, medical comforts, and other stores supplied by the Control Department.
- (g) For making funeral arrangements when required by the Medical Officer to do so, and reporting the expenses to the Medical Officer.
- (h) For making, on the receipt of proper vouchers, all disbursements in connection with the above services; for payment of the Hospital Staff and subordinates, payment for medicines and leeches purchased locally by Medical Officers, postage and other contingencies, and for all cash accounts required by the War Office.
- (i) For providing transport for all field equipment and supplies.
- (k) For providing and keeping in an efficient state all transport for sick, or for hiring the same when required.
- (l) For the annual supply of stationery and forms on requisition of the Medical Officer.
- (m) For all accounts required by the War Office of equipment and supplies.
- (n) For the inspection of equipment and stores in accordance with existing regulations, and for assessing (in the manner hereinafter directed) against the troops in occupation of the hospital, the value of equipment damaged or deficient.
- (o) For the necessary inspection of each hospital on the departure of troops whose sick have occupied it, or on the transfer of charge from one Medical Officer to another.

8. The Royal Engineer Department will (as laid down in Clauses 79 and 157, Army Circulars, 1870) be responsible—

- (a) For the periodical inspection, maintenance, and repair of all hospital buildings and fixtures, whitewashing, and any structural alterations, and for assessing all damages to such buildings and fixtures.
- (b) For the supply of water, except when transport is requisite.
- (c) For the working of all fixed machinery and engines by steam or other power.
- (d) For the general charge and maintenance of burying-grounds attached to military hospitals.
- (e) For laying out and planting all hospital grounds and gardens, and for making and repairing all fences, roads, and walks therein.

9. All requisitions for supplies and vouchers for hospital expenditure chargeable against the public, to whatever department they may be rendered, will be signed by the Medical Officer in charge.

10. In the event of the absence of an officer of the Control Department, or of failure on the part of the Control Department or its agents (*e.g.* local contractors for provisions and medical comforts) to deliver good and efficient supplies, the Medical Officer in charge will have a discretionary power to make purchases, with the understanding that any such departure from the usual course shall be at once justified by an explanation to the Principal Medical Officer, for reference to the Controller. This power must at all times be used on the individual responsibility of the officer exercising it. Supplies so purchased and allowed by the Secretary of State, will be chargeable against the Control Vote for supplies, except in those cases in which the expense can properly be recovered from the Contractor.

11. The Medical Officer in charge will be empowered, where there is no local representative of the Royal Engineer Department at the station, or when

reference would cause delay which would be detrimental to the patients, to order urgent and necessary repairs to buildings (such as the repair of broken glass, damages to roofs, injuries to gas or water pipes and closets), to be executed at once by the triennial Contractor or his agent, or, in the Contractor's default or absence, by some other local tradesman. In all such cases, however, the Medical Officer will send a copy of his order simultaneously to the Engineer Officer in justification of his proceedings, and the expense so incurred will be charged against the Works Vote.

12. At the first handing over of the equipment and stores to the Medical Department, the necessary inventories will be prepared and signed by the Control Officer who transfers the articles, and the signature of the Medical Officer in charge on the same documents as having "Received the above," will be a sufficient voucher for his responsibility for the safe custody of the supplies. At each periodical inspection by the Control Department, or when transfer of charge takes place, every article of equipment, and all stores, will have to be accounted for.

13. Damages to buildings or stores, or charges for the loss of stores, will be assessed as follows :—

- a. Any breakage or damage (not coming under the head of "fair wear and tear," or not admissible as a charge against the public) that is traced home to a patient, or that has been caused by his individual neglect of the rules of the hospital (a copy of which should be hung up in every ward), will be charged against him, the damage being notified to him by the Medical Officer in charge, who will keep a record of all such damages for the information of the Engineer or Control Department, as the case may be, as well as the patient's Commanding Officer.
- b. The charges for all breakages or damage not coming under the head of "fair wear and tear," or chargeable against the public, and that cannot be traced to individuals, will be assessed each month as a "general charge" against the servants in that particular hospital.

14. In carrying out the rules laid down in the foregoing article, should any difference of opinion arise between the Medical and Control Departments, or between the Medical and Engineer Departments, or should any patient wish to appeal against any charge for damages to be assessed against him, the case will be referred by the Medical Officer in charge to the Governor or to the Commandant of the hospital if there be one, or if not to the General or other Officer Commanding, whose decision will be final.

15. At the inspections held on any transfer of stores or buildings from one Medical Officer to another, the Control Officer or member of the Royal Engineer Department, as the case may be, making the inspection will call the attention of the outgoing Medical Officer to all damages to the buildings, and to any losses of, or damages to, articles on the inventories. The damages and losses will be assessed by the Inspecting Officers, and at once made good. The signature of the inventory by the Medical Officer taking charge will be sufficient to show that he has taken the responsible charge of the articles; the Officer being careful to add the date of signature.

16. All documents in connection with losses or deficiencies of equipment or stores, will be prepared by the Control Department, which will receive the information against whom the assessments are to be made from the Medical Officer in charge.

17. All articles issued for hospital purposes are exclusively for the use of the sick. They will not, at any time or under any circumstances, be applied to any other purpose, or used in any place not actually connected with or set apart for the treatment or administration of the sick.

18. Fuel and light for hospital purposes will be delivered by the Control Department into the hospital stores weekly in advance, on requisition signed by the Medical Officer in charge of each hospital; and the ordinary issues will be in accordance with the scale laid down by regulation. Any extra issue deemed requisite must receive the approval of the Principal Medical Officer, but this may be obtained by the Medical Officer after the issue has been made; and in the event of the Principal Medical Officer not approving of the issue,

the Medical Officer who signed the requisition will be liable for the extra expenditure.

19. The requisitions made for all issues of fuel and light will be sufficient vouchers for their expenditure, provided such requisitions are receipted by the Medical Officer in charge.

20. Consumable articles for cleaning purposes will be allowed on a fixed scale for the use of all hospitals, and will be accounted for in accordance with such scale. The requisitions will, as in the case of fuel and light (*see* paragraph 19), be the voucher for the expenditure.

21. In all hospitals the system of drawing perishable articles of diet or medical comforts will be by daily requisitions on the Control Department, or their agents or contractors. Articles not perishable will be drawn in quantities calculated to last a week or longer, according to circumstances.

22. The forms to be rendered by Medical Officers to account for the expenditure will be as follows:—

- (1st.) Daily Diet Sheet of Patient (W. O. Form 1145).
- (2nd.) Monthly Abstract of Diets and Extras on W. O. Form 175.
- (3rd.) Monthly "Extra" Sheets on W. O. Form 1200.
- (4th.) Monthly Statement of Provisions, &c., received, expended, and remaining (W. O. Form 184).

23. These documents will be sent at the end of each month to the Control Officer or his representative at the station. After ascertaining the correctness of the Abstracts of Diets and Extras, that Officer will forward the Diet Sheets (W. O. Form 1145) and Extra Sheets (W. O. Form 1200) to the Principal Medical Officer of the district.

24. The Control Department will not exercise any check over the quantities of articles of diet, or extras issued to individual patients.

25. Prescribing Medical Officers will be held directly responsible to the Principal Medical Officer for all entries on their Diet and Extra Sheets, and when called upon will have to justify the necessity of the issue of all articles ordered by them.

26. The Principal Medical Officer will supervise the nature and quantities of diets and extras, as suited to individual cases. It will be his duty to call for explanation of any seeming excess of issue, to check irregularities, or any apparent waste or extravagance, and to report the same, with his opinion thereon, to the Director-General, Army Medical Department, for such action as may be necessary.

27. In carrying out the arrangements above laid down, the Officers of the Medical and Control Departments will be directly responsible to their own departmental superiors,—viz., the Principal Medical Officer, and the Controller of the district or division respectively. The duties of each department being clearly defined, any failure on the part of either department to carry out the regulations laid down for its guidance in relation to the other, will be a matter to be dealt with by a reference from the Principal Medical Officer to the Controller, or *vice versa*; and in case of these officers not agreeing as to the course to be pursued, the matter will be submitted for the decision of the Governor of the Hospital, or of the General or other Officer Commanding.

28. The transfer of these duties, and the introduction of the new Regulations extending the responsibilities of Medical Officers, will take effect in the various Commands at such dates as the Subordinate Hospital Establishment, now being organized, shall have been placed at the disposal of the Army Medical Department, in order to enable them to undertake the performance of the increased duties.

2nd.—GENERAL ORDERS.

III. *Discharges.*

G. O. 45.

1st May, 1872.

The medical history sheets of all invalids are, in future, invariably to *accompany* their discharge documents, for the consideration of the Commissioners of Chelsea Hospital.

IV. *Leave of Absence for Medical Officers.*

G. O. 81.

1st October.

Paragraph 682 of the "Queen's Regulations and Orders for the Army" is to be amended as follows :—

682. All applications for leave of absence for medical officers serving at home will be made on W. O. Form 1,119, through the Director-General, Army Medical Department, to the Adjutant-General. Medical officers not attached to regiments will first obtain the permission of the General Officer Commanding before applying through the principal medical officer of the district.

Medical officers attached to regiments, will first obtain the permission of the principal medical officer before applying through their commanding officers to the district authorities. The grant of leave will in all cases be notified to the district authorities by the Adjutant-General.

Officers commanding, in recommending medical officers for leave of absence on private affairs, will be careful to ascertain that the distribution and state of health of their corps, as well as the arrangements for the carrying on of all regimental medical duties, are such as to justify their recommendation.

V. *Dress of Officers.* "Extracts."

G. O. 96.

1st December.

Para. 11. Medical officers having the relative rank of field officer are to provide themselves with chargers and horse furniture, and to appear mounted when required to attend parades.

Para. 26. Medical officers of cavalry regiments, in which the officers have dress and undress belts, are to wear their dress belts on full dress parades when the other officers wear gold belts. On other occasions they will wear undress belts. In regiments in which gold belts only are worn by the officers, medical officers are to wear dress belts at all times.

3rd.—DEPARTMENTAL CIRCULARS, &c.

I. *Practice of Sick "attending" Hospital forbidden.*

4th January, 1872.

There is much reason to believe that a custom of detaining men in hospital "for the day" as it is termed, is carried to a very objectionable extent, not alone in creating disorder in wards ; but in grave respect to the prejudice in many instances of subsequent specific treatment, which further developments of disease require.

Not only for one day, but for two, if not more, have men been kept so attending hospital to be sent back to their barrack-rooms in the evening under

the possible risk of a superficial examination, and not seldom, they have had eventually to be regularly admitted under symptoms of serious aspect, or possibly the eruption of contagious disease, as has recently occurred in an instance of developed small-pox.

The closest attention of Principal Medical Officers is earnestly requested to control this deviation from the regulation for hospitals, in accordance with the spirit of which every man should either be at his duty or in hospital, and it must be clearly understood that no cases, save those of the most palpably trivial character of ailment or injury are to be withheld from immediate admission.

T. G. LOGAN, *Director-General.*

II. *Certificates of Operative Surgery.*

15th May.

Instances having lately occurred of informality and insufficiency as regards the certificates of operative surgery required from every assistant-surgeon at the time of his examination for promotion ;

Principal Medical Officers at home and abroad will be careful to notice before forwarding the examination papers to this department, that the documents in question are in accordance with the regulations which demand—

“A certificate from the surgeon of the regiment, or other superior medical officer, that the assistant-surgeon has availed himself of *every opportunity of practising surgical operations on the dead body.*”

T. G. LOGAN, *Director-General.*

III. *All Leave to Medical Staff Officers must be Reported.*

21st September.

As the period of leave allowed to Staff Medical Officers is now strictly limited to the regulation term of 61 days, it has become necessary to keep a record at head-quarters of all applications conceded under that head.

Principal Medical Officers at home are informed that whilst they will be at liberty henceforward to submit for local approval, and without reference to me, that Medical Officers of the Staff may be granted leave for any period under a week, all such instances must be reported at the time of sanction to this department, for the information of the Secretary of State for War.

T. G. LOGAN, *Director-General.*

IV. *All Medical Boards on Officers, whether “in and by the Service.”*

10th December.

¹ In the proceedings of all Medical Boards on sick officers it should be distinctly stated that the disability has, or has not been contracted in and by the service, and from the effects of the climate, and Principal Medical Officers will be so good as to see that this regulation is invariably carried out in all cases.

T. G. LOGAN, *Director-General.*

APPENDIX No. XV.

Abstract No. 1, showing the Admissions into Hospital, Deaths, and Invaliding among the Troops in the United Kingdom in 1871.

	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Strength	1,204		10,463				12,123		6,222		47,420		2,280		7,431						
Diseases.																					
I. General Diseases.																					
1. Febrile :																					
Small Pox..	2	..	..	13	3	..	28	2	42	4	87	11	8	..	..	11	1	..	..	..
Chicken Pox	..	..	..	..	..	..	3	..	4	..	22	..	..	..	..	..	..	..	..	..
Measles ..	3	..	..	8	..	..	17	..	31	..	58	..	5	..	..	10	..	..	6	..
Cow Pox ..	..	..	..	8	..	..	35	..	..	..	39	..	10	..	..	..	..	..	..	..
Scarlet Fever	2	..	..	30	..	..	21	..	5	..	108	9	11	..	..	11	1	..	..	..
Typhus ..	..	..	..	..	..	..	..	..	..	..	3	3	..	..	..	..	..	..	..	..
Cerebro-Spinal Fever	..	..	..	..	1	..	..	..	..	..	2	2	..	..	..	..	..	..	..	..
Enteric Fever	2	..	..	11	2	..	8	..	4	3	49	16	..	..	..	..	1	..	..	..
Relapsing "	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Simple Continued Fever..	2	..	..	79	..	..	100	..	120	..	430	3	32	..	..	56	1	..	..	..
Febricula ..	1	..	..	109	..	..	136	..	39	..	527	..	62	..	..	78	..	..	..	..
Ague ..	..	..	..	44	..	..	250	..	7	..	406	..	99	..	1	184	..	..	..	..
Remittent Fever ..	..	..	..	2	..	..	2	..	..	..	19	..	..	..	..	6	..	..	..	..
Influenza ..	9	..	..	59	..	..	92	..	58	..	357	..	33	..	..	46	..	..	..	..
Erysipelas ..	1	..	..	20	..	1	45	..	11	1	124	5	17	1	..	15	..	..	..	..
Pyæmia ..	..	..	..	..	1	..	..	..	1	1	2	2	..	..	..	..	..	..	..	..
Mumps ..	..	..	..	16	..	..	31	..	15	..	111	..	2	..	..	8	..	..	..	..

[illegible]

II. Local Diseases.

1. Nervous System:

Encephalitis	..	..
Meningitis	..	..
Softening of Brain	..	..
Apoplexy	..	..
Sunstroke	..	..
Paralysis	..	..
Myelitis	..	..
White softening of Spinal	..	..
Tetanus	..	..

Abstract No. 1—continued.

	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Strength	1,204	10,462	12,123	6,222	47,420	2,280	7,431														
Diseases.																					
Epilepsy ..	1	28	11	55	18	3	132	47	20	6	26	17									
Hysteria ..	..	1	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Chorea ..	..	..	..	2	..	..	4	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Vertigo ..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Neuralgia ..	2	40	..	43	2	1	96	..	7	..	..	..	..	..	..	..	..	..	13	..	1
Mania ..	1	3	2	8	2	..	19	4	2	1	8	3	19	4	..	2	..	..	8	..	3
Dementia ..	1	18	7	15	7	1	66	3	2	..	5	34	66	3	..	2	..	..	12	..	5
Hypochondriasis ..	..	8	1	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tumour of Brain ..	..	1	1	..	1	..	2	2	..	..	..	..	..	2	..	..	..	..	1	1	..
Abscess of Brain ..	..	1	1	2	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Convulsions ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Locomotor Ataxy ..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..
Tumour ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Anæsthesia ..	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hemicrania ..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Functional Disease ..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Spasm of Muscle ..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Of the Eye:																					
Conjunctivitis ..	5	47	1	110	1	..	567	8	24	..	87	..	..	..	..	..	..	..	..	..	1
Purulent Ophthalmia ..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tarsal ..	1	26	1	21	1	..	102	3	12	..	9	..	..	..	..	..	..	..	..	..	..
Anaurosis ..	1	..	1	2	2	..	2	..	..	..	1	..	..	..	..	..	..	..	1	..	..

[illegible]

3. Of the Ear:

Inflammation	Membr: Tympani
Deafness	..
Inflammation	External
Mestus	..
Otitis	..
Obitis	..
Abcess	..
Necrosis of Petrous Bone	..
Inflammation of Ear	..
Polypus	..
Accumulation of Wax	..
Otorrhea	..

Abstract No. 1—continued.

Diseases.	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	1,204			10,462			12,123			6,222			47,420			2,280			7,431		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Strength
Diseases.																					
4. Of the Nose :																					
Epistaxis
Ozena	5	..	..	..	..	..	3	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Polypus nasi
5. Circulatory System :																					
Pericarditis	13	1	6	7	..	1	..	..	..	23	4	4	1	..	..	..	6	3
Endocarditis	1	..	..	1	1	..	..	..	..	1	..	1	..	..	..	..	1	..
Valve Disease of Heart	25	7	12	54	11	32	16	1	14	141	14	66	..	1	..	42	4	17
Hypertrophy	2	..	..	14	1	9	3	2	2	40	4	18	5	..	..	6	..	7
Astrophy	2	..	..	..	..	..	..	..	..
Dilatation	2	1	..	..	..	..	2	..	1	..	..	..	..	..	..
Degeneration	2	..	1	3	..	1	2	..	..	1	..	1	..	..	..	..	..
Angina Pectoris	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Syncope	3	..	1	3	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Aneurism of Heart	1	..	..
Palpitation	3	..	4	75	..	24	3	..	..	186	1	..	..	..	..	1	..	..
Aneurism of Aorta	1	1	1	11	12	..	9	10	..	3	4	..	30	27	7	25	..	..	25	5	6
Degeneration	1	..	..	..	..	..	..	..	..	..	..	9	1	..	..	..	..	6	1	..
Aneurism	2	1	1	1	..	..	2	..	..	1	..	2	..	..	..	..	..	..
Phlebitis	3	..	..	..	..	..	1	..	..	1	..	1	..	..	..	3	..	..
Varicose Veins	9	..	5	26	..	12	1	..	..	47	..	16	..	..	..	1	..	6
Nervus Vascularis	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Rupture of Veins of Leg	1	..	..	..	..	..	..	..	..	..	..	..
Venous Obstruction	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..

6. Absorbent System :															
Inflammation of Glands ..	9	..	135	..	156	..	46	..	1	532	..	31	..	57	2
Suppuration " " ..	3	..	30	..	20	..	4	..	..	51	..	3	..	8	..
Enlargement " " ..	..	..	1	..	1	..	1	..	1	1	..	..	..	1	..
Inflammation of Lymphatics ..	..	..	..	..	..	..	1	..	..	15	..	..	..	..	..
Tumour .. .. .	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..
7. Of Ductless Glands :															
Goitre .. .. .	..	..	..	..	..	..	..	..	..	4	..	2	..	..	..
Fibrous Tumour ..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8. Respiratory System :															
Laryngitis .. ..	..	..	7	..	4	..	1	..	..	11	2	2	..	4	2
Œdema of Glottis ..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..
Coryza .. .. .	..	..	..	..	1	..	..	..	..	6	..	..	..	..	..
Aphonia .. .. .	..	..	..	..	..	..	..	..	..	8	..	..	..	..	..
Bronchitis	85	1	543	1	1235	2	11	356	1	3299	4	36	1	479	7
Asthma .. .. .	..	..	6	4	3	..	2	..	..	33	..	4	..	6	2
Pneumonia	7	..	70	8	75	10	..	23	6	305	36	1	..	47	8
Congestion of Lungs ..	..	..	1	1	1	..	1	..	..	1	..	..	..	..	..
Pulmonary Extravasation ..	..	..	9	2	..	..	..	..	..	4	1	..	..	2	..
Gangrene of Lung ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy	5	..	28	1	36	1	4	37	2	199	7	2	..	17	..
Hydrothorax .. ..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..
Malformation of Chest ..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..
Contraction of Thorax ..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
9. Digestive System :															
Ulcer of Tongue ..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..
Gum Boil .. .. .	..	..	12	..	..	..	4	..	..	62	..	16	..	8	..
Ranula .. .. .	..	..	..	..	..	..	2	..	..	2	..	..	..	..	..
Loss of Teeth and Abnormal Palate ..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Inflammation of Gums ..	..	..	..	..	20	..	..	..	..	17	..	1	..	..	2
Stomatitis .. ..	..	..	..	..	..	..	..	..	..	8	..	..	..	..	..

Abstract No. 1—continued.

Strength	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
	1,204			10,462			12,123			6,222			47,420			2,280			7,431		
Diseases.																					
Tonsillitis ..	45	..	..	255	..	..	559	..	..	133	..	..	1657	..	1	253	..	..	255	..	1
Quinsy ..	2	..	..	..	..	..	3	..	..	1	..	..	9	..	..	..	..	..	..	..	..
Sore Throat ..	1	..	..	27	..	..	40	..	..	1	..	..	11	..	..	..	..	..	..	..	..
Enlarged Tonsils ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Pharyngitis ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gastritis ..	..	..	..	3	..	..	1	..	..	1	..	..	11	..	..	..	..	..	..	..	..
Dyspepsia ..	42	..	..	108	..	..	304	..	2	101	..	..	772	..	..	46	..	..	154	..	..
Enteritis ..	..	..	..	1	..	..	1	..	..	..	..	..	8	..	..	..	..	..	..	..	..
Dysentery ..	..	..	..	11	..	..	34	..	2	..	..	..	35	..	..	8	..	..	35	..	4
Diarrhoea ..	27	..	..	96	..	..	248	..	29	110	..	..	516	..	1	28	..	..	71	..	11
Hernia ..	..	..	..	15	..	..	52	..	..	5	..	..	91	..	1	19	..	..	20	..	..
Colic ..	6	..	..	12	..	..	28	..	..	85	..	..	101	..	..	17	..	..	12	..	..
Tania Solium ..	..	..	..	2	..	..	6	..	..	1	..	..	28	..	..	5	..	..	8	..	..
Ascari Lumbricoidee	..	..	..	..	..	..	1	..	..	..	..	..	8	..	..	1	..	..	..	..	..
Constipation ..	..	..	..	3	..	..	8	..	..	..	..	..	88	..	..	2	..	..	1	..	..
Fistula in Ano ..	2	..	..	8	..	..	68	..	2	4	..	3	24	..	..	1	..	..	3	..	..
Hemorrhoids ..	2	..	..	37	..	..	88	..	1	5	..	..	156	..	1	9	..	..	21	..	..
Hepatitis ..	..	..	..	41	3	4	98	5	17	1	..	..	210	9	26	19	..	..	122	..	24
Enlargement of Liver	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	..	4	..	..
Abscess of Liver ..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	1	..	..
Congestion of Liver	..	..	..	..	..	..	2	..	..	..	..	..	7	..	..	..	..	..	1	..	..
Atrophy of Liver ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Cirrhosis ..	..	..	..	..	1	..	..	..	..	1	..	..	4	..	..	..	..	..	1	2	..

Jaundice ..	6	..	25	2	..	54	1	..	36	..	..	178	1	..	8	14	..	23
Splenitis ..	..	..	..	..	..	6	1	..	..	..	..	24	..	..	1	1	..	14
Hypertrophy of Spleen ..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	..	..
Pertinitis..	..	..	1	2	..	..	..	..	..	..	..	5	1	..	..	..	..	..
Ascites ..	1	..	1	..	..	..	..	..	1	..	..	7	1	..	..	..	..	3
Intestinal Hemorrhage ..	..	..	..	..	..	..	..	..	2	..	..	..	1	..	1	1	..	..
Hematemesis ..	..	..	3	1	..	1	..	..	..	..	..	11	1	..	..	1	..	5
Condyloma of Anus ..	..	..	7	..	..	3	..	..	..	..	..	33	..	..	..	..	..	..
Gastrodynia ..	2	..	2	..	..	1	..	..	..	..	..	1	..	..	..	2	..	..
Thrush ..	1	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Obstruction of Intestines ..	1	1	1	..	..	2	..	..	..	..	..	2	1	..	..	..	..	..
Threadworm ..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..
Hemorrhage from Rectum ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Melena ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Fissure of Anus ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Prolapsus Ani ..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..
Ulcer of Rectum ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
Prolapsus of Rectum ..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	1
Inflammation of Colon ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gloesitis ..	..	..	..	..	..	3	..	..	..	..	..	1	..	..	..	..	..	..
Abscess of Mouth..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
Ulcerated Gum ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Vomiting ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Inflammation of Sublingual Gland ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Intussusception ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Inflammation of Salivary Glands ..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..
Ulcer of Stomach..	..	..	..	..	..	1	1	1	..	..	..	4	..	..	..	..	..	..
Abscess of Pancreas ..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..
Hemorrhage ..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Inflammation of Alveoli ..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Abscess of Tongue ..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..
Typhlitis ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Perforating Ulcer of Stomach ..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Internal Strangulation of Intestines ..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..

Abstract No. 1—continued.

Diseases.	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Strength	1,204	10,462	12,123	6,222	47,420	2,280	7,431														
Bright's Disease ..	1	1	4	7	2	4	27	10	8	1	..	1	..	..	..	7	..	2	..	..	..
Nephritis ..	..	..	..	6	..	..	20	..	..	..	..	..	..	..	..	4	..	..	..	..	..
Hæmaturia ..	..	..	..	1	..	..	5	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Diureals ..	..	..	..	2	..	..	8	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Suppression of Urine ..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cystitis ..	..	..	..	4	..	..	11	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gonorrhoea ..	55	..	..	1771	..	..	437	46	..	..	..	..	4780	..	..	404	..	..	814	..	..
Physoals, &c. ..	1	..	..	6	..	..	11	..	..	..	..	..	71	..	..	8	..	..	5	..	..
Bubo ..	..	..	..	50	..	..	2	..	..	..	..	..	66	..	..	12	..	..	6	..	..
Epididymitis, Gonorrhoeal Stricture of Urethra ..	4	..	1	38	..	1	43	..	..	..	..	..	166	..	..	6	..	..	24	..	..
Urinary Fistula ..	2	..	1	41	..	1	11	..	..	..	..	..	81	..	..	5	..	..	27	..	..
Incontinence of Urine ..	..	..	3	6	..	..	1	..	..	..	..	..	2	..	..	..	..	..	1	..	..
Retention of Urine ..	..	..	..	19	..	..	..	..	..	..	..	..	49	..	..	1	..	..	..	..	..
Extravasation of Urine ..	..	..	..	..	..	..	1	..	..	..	..	..	4	..	..	..	..	..	..	..	..
Inflammation of Urethra ..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Condyloma ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Inflammation of Prostate Gland ..	..	..	..	6	..	..	..	..	..	..	..	..	6	..	..	8	..	..	1	..	..
Abscess ..	..	..	..	1	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..
Paralysis of Bladder ..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Irritability of Bladder ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

10. Urinary System:

[illegible]

12. Organs of Locomotion:

Otitis	..	..	..
Caries	..	..	..
Necrosis	..	..	..
Synovitis	..	..	..
Droopy of Joint	..	..	..
Bursal Abscess	..	..	..
Bursal Tumour	..	..	..
Contraction	..	..	..
Enlarged Bursa Patellæ	..	..	..
Enlargement of Joint	..	..	..
Wasting of Muscle	..	..	..
Cartilaginous Tumour	..	..	..
Psoas Abscess	..	..	..
Bunion	..	..	..

Abstract No. 1—continued.

Diseases.	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	1,204			10,462			12,123			6,222			47,420			2,280			7,431		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Strength
Diseases.																					
Malformation of Feet, & Lameness	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Ossaceous Tumour	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Muscular Atrophy	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Inflammation of Tendons	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Curvature of Spine	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Relaxation of Ligaments
Tumour
Abscess
Diseased Joint
Wryneck
Atrophy
Osteo-sarcoma
Ganglion	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Flat Feet	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Club Foot
Ankylosis
Lameness of Knee Joint	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Loose Cartilage
13. Of Cellular Tissue:
Inflammation of Cellular Tissue	10	..	..	25	..	..	38	..	..	8	..	1	176	..	..	3	..	..	34	..	..
Abscess	46	..	..	182	..	..	283	..	..	122	..	1	737	..	..	46	..	..	89	..	..
Obesity	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

[illegible]

Abstract No. 1—continued.

	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Strength	1,204			10,462			12,123			6,222			47,420			2,380			7,431		
Diseases.																					
Irritation by Crab-lice ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pruritus .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Intestigo .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sycosis .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Periphiagus .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nevus .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ichthyosis .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fissure of Lip .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Delhi Boil.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sebaceous Tumour .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fatty Tumour .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tumour .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
III. Conditions, &c.																					
General Debility	7	2	9	37	..	9	45	..	11	..	14	3	201	..	21	23	..	4	29	..	17
IV. Poisons.																					
Delirium Tremens	2	..	..	16	..	..	23	3	..	..	11	..	79	2	..	9	..	..	13	1	..
Alcohol .. .. .	..	..	..	1	1	..	1	..	..	..	..	..	5	1	..	..	..	..	..	..	..
Morbid Secretions .. .. .	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Snake-bite .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Opium .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Prussic Acid .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

V.	Injuries.
2.	Accidental:
Burns and Scalds..
Multiple Injury
Asphyxia by Drowning
Exposure to Cold..
Contusion
Concussion of the Brain..
Fracture
Wounds
" from Gunshot
Sprain
Laceration
Disection
Blisters of the Feet
" Hands
Rupture of Muscles
Tendon
" " Tendon
Injury to Shoulder Joint..
Foreign body in Oesophagus
" Intestines
Injury to Spine
" Abdomen
Rupture of Liver
Foreign body in Cornea
Loss of Finger
Rupture of Intestines by Injury..
Multiple Injury by Railway
Poisoned Wound
Fracture of Skull by Railway
Asphyxia by Fire..
8. Homicidal :	
Contusion
Wound
Fracture of Skull..

Abstract No. 1—continued.

	Household Cavalry.			Cavalry.			Royal Artillery.			Foot Guards.			Infantry Regiments.			Royal Artillery Depot Brigade.			Depôts.		
	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Strength	1,204			10,462			12,123			6,222			47,430			2,380			7,431		
Diseases.																					
4. Self-inflicted:																					
Cut Throat	1						3	3	1				4	2		1			3		
Gunshot																					
Drowning																					
Hanging																					
Poison																					
Decapitation by Rail																					
Multiple Injury																					
Amputation of Penis																					
Not stated.. .. .																					
VI. Surgical Operations.																					
Amputation of Thigh							2		1	2		1	1					2			
" Finger																					
" Thumb																					
Excision of Cancer																					
Ligature of Femoral Artery																			1		
Causes not ascertained																					
No appreciable Disease																			9		
Total	802	9	12	7690	94	193	12,109	107	363	4,143	52	186	34,287	385	838	2,788	15	67	5,489	68	283

APPENDIX No. XV—continued.

ABSTRACT No. 2, showing the Number of Men belonging to the Regiments serving at Home who were Vaccinated during the Year 1871.

	Results.	In those who bore Marks of previous Small-pox.	In those who bore good Marks of previous Vaccination.	In those who bore doubtful Marks of previous Vaccination.	In those who bore no Marks of previous Vaccination or Small-pox.	Total.
Soldiers, not Recruits.	{ A perfect vaccine pustule	365	3,537	454	235	4,591
	{ A modified ditto	345	4,458	596	184	5,583
	{ A failure in	273	3,094	566	176	4,109
	Total	983	11,089	1,616	595	14,283
Recruits.	{ A perfect vaccine pustule	438	8,022	253	669	9,382
	{ A modified ditto	464	8,054	186	285	8,989
	{ A failure in	42	6,396	130	239	7,190
	Total	1,327	22,472	569	1,193	25,561

APPENDIX No. XV—continued.

ABSTRACT No. 3, showing the Ages of the Troops serving in the United Kingdom, and the Deaths at each Age, during the Year 1871.

	Under 20.			20 and under 25.			25 and under 30.			30 and under 35.			35 and under 40.			40 and upwards.			Total.	
	Average Strength.	Died.		Average Strength.	Died.		Average Strength.	Died.		Average Strength.	Died.		Average Strength.	Died.		Average Strength.	Died.		Average Strength.	Died.
Household Cavalry	96	..	..	881	2	..	311	..	..	183	3	..	134	3	..	100	1	..	1,204	9
Cavalry of the Line	2,139	1	..	3,092	22	..	2,082	6	..	2,189	31	..	783	24	..	227	10	..	10,482	94
Royal Artillery	2,511	9	..	3,814	13	..	2,736	18	..	2,093	30	..	1,065	29	..	206	8	..	12,123	107
Foot Guards	1,598	5	..	1,767	16	..	1,413	11	..	900	12	..	454	5	..	70	3	..	6,222	52
Infantry Regiments	12,914	53	..	11,765	75	..	8,345	56	..	9,926	121	..	3,857	63	..	613	17	..	47,420	385
Total	19,257	68	..	20,539	128	..	14,886	91	..	15,241	197	..	6,293	124	..	1,215	39	..	77,431	647
Depôt Brigade, R.A.	791	2	..	778	2	..	275	1	..	234	3	..	129	6	..	73	1	..	2,280	15
Depôts, Line	1,925	9	..	2,122	8	..	996	10	..	1,329	18	..	856	14	..	201	3	..	7,428	62
Coast Brigade, R.A.	3	..	..	14	..	..	51	..	..	399	11	..	722	19	..	365	8	..	1,554	38
Total	2,719	11	..	2,914	10	..	1,321	11	..	1,962	32	..	1,707	39	..	639	12	..	11,262	115

APPENDIX No. XV—continued.

ABSTRACT No. 4, showing the Number of Recruits Inspected, and the Number found unfit for the Service in each of the Recruiting Districts, during the Year 1871.

Districts.	Primary Inspections.	Secondary Inspections.		Total.
		Had been previously examined by Staff Surgeon or other Army Medical Officer.	Had been previously examined by Private Medical Practitioner.	
London .. { Inspected	7,436	426	1,604	9,466
{ Rejected	2,898	17	180	2,545
Liverpool .. { Inspected	1,384	71	371	1,826
{ Rejected	467	7	60	534
Bristol .. { Inspected	647	11	739	1,387
{ Rejected	201	..	26	229
York .. { Inspected	179	360	300	839
{ Rejected	45	29	51	125
Birmingham. { Inspected	853	38	526	1,417
{ Rejected	281	11	95	387
Devonport .. { Inspected	268	120	217	705
{ Rejected	76	7	23	106
Manchester.. { Inspected	688	10	75	773
{ Rejected	298	..	18	316
Peterborough { Inspected	71	66	396	533
{ Rejected	17	..	31	48
Portsmouth.. { Inspected	251	144	225	620
{ Rejected	105	13	37	155
Edinburgh .. { Inspected	561	25	67	653
{ Rejected	162	..	4	166
Glasgow .. { Inspected	969	64	39	1,072
{ Rejected	413	6	7	425
Inverness .. { Inspected	51	6	26	83
{ Rejected	10	..	3	13
Dublin .. { Inspected	1,007	401	270	1,678
{ Rejected	348	30	43	421
Total { Inspected	14,865	1,762	4,965	21,092
{ Rejected	4,820	120	600	5,540

APPENDIX No. XV—*continued.*

ABSTRACT No. 5, showing the Native Countries of the Recruits inspected at the Head-Quarters of each of the Districts in 1871.

Districts.	England.		Wales.		Scotland.		Ireland.		British Colonies or Foreign Countries.	
	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.
London ..	7,012	2,298	41	6	127	35	209	49	47	15
Liverpool ..	951	350	18	5	148	39	213	57	54	16
Bristol ..	519	166	114	28	1	..	13	7	..	..
York ..	149	37	2	..	16	5	12	3	..	..
Birmingham ..	817	268	9	3	7	3	16	5	4	2
Devonport ..	251	70	..	..	2	..	12	4	3	2
Manchester ..	547	238	..	..	18	7	119	52	4	1
Peterborough ..	71	17	..	..	..	..	..	..	..	..
Portsmouth ..	232	97	2	1	5	1	12	6	..	..
Edinburgh ..	19	8	..	..	513	140	26	13	3	1
Glasgow ..	49	22	..	..	646	269	272	120	2	1
Inverness ..	..	..	..	..	51	10	..	..	..	..
Dublin ..	61	12	..	..	17	8	918	332	11	1
Total ..	10,678	3,578	186	43	1,551	512	1,822	648	128	39

ABSTRACT No. 6, showing the Ages of Recruits Inspected in 1871.

	Boys under 17.	From 17 to 18.	From 18 to 19.	From 19 to 20.	From 20 to 21.	From 21 to 22.	From 22 to 23.	From 23 to 24.	From 24 to 25.	25 and upwards.
At Head-Quarters of Recruiting Districts ...	135	858	3,531	3,629	2,218	1,359	991	754	760	130
At Regiments and Depôts ...	468	1,115	3,240	3,138	1,855	1,230	983	679	473	149
By Civil Medical Practitioners ...	54	287	1,955	2,448	1,338	808	639	463	471	54
Total ...	657	2,260	8,726	9,215	5,411	3,397	2,613	1,896	1,704	333

APPENDIX No. XV—*continued*.

ABSTRACT No. 7, showing the Heights of the Recruits Inspected in 1871.

	Under 5 ft. 3 in.	From 5 ft. 3 in. to 5 ft. 4 in.	From 5 ft. 4 in. to 5 ft. 5 in.	From 5 ft. 5 in. to 5 ft. 6 in.	From 5 ft. 6 in. to 5 ft. 7 in.	From 5 ft. 7 in. to 5 ft. 8 in.	From 5 ft. 8 in. to 5 ft. 9 in.	From 5 ft. 9 in. to 5 ft. 10 in.	From 5 ft. 10 in. to 5 ft. 11 in.	From 5 ft. 11 in. to 6 ft.	6 ft. and upwards.
At Head-Quarters of Recruiting Districts ...	124	19	1,688	4,676	3,250	2,237	1,165	690	264	120	52
At Regiments & Depôts ...	416	240	2,773	3,063	2,525	1,943	1,190	610	277	184	108
By Civil Medical Practitioners ...	30	4	718	2,430	1,960	1,427	939	585	229	91	54
Total ...	570	263	5,179	10,219	7,766	5,657	3,294	1,885	770	395	214

ABSTRACT No. 8, showing the Number of Recruits inspected in 1871, at the Head-Quarters of Recruiting Districts, at the following Weights and Ages.

Ages.	Under 100 lbs.	From 100 lbs. to 110 lbs.	From 110 lbs. to 120 lbs.	From 120 lbs. to 130 lbs.	From 130 lbs. to 140 lbs.	From 140 lbs. to 150 lbs.	From 150 lbs. to 160 lbs.	From 160 lbs. to 170 lbs.	From 170 lbs. and upwards.	Total.
Boys under 17 ...	114	16	4	2	...	...	...	...	...	135
From 17 to 18 ...	5	71	332	267	135	36	10	2	...	868
„ 18 to 19 ...	6	184	1,143	1,185	661	269	70	13	...	3,531
„ 19 to 20 ...	19	169	757	1,423	803	347	99	21	1	3,629
„ 20 to 21 ...	3	51	275	667	738	357	91	27	9	2,218
„ 21 to 22 ...	...	13	158	358	393	269	115	25	8	1,359
„ 22 to 23 ...	...	5	82	285	321	175	81	28	14	991
„ 23 to 24 ...	...	3	74	195	246	137	68	28	12	754
„ 24 to 25 ...	...	7	68	158	235	169	79	35	9	760
Upwards of 25 ...	...	5	14	30	41	18	11	8	3	130
Total ...	147	513	2,907	4,661	3,573	1,797	624	187	56	14,365

APPENDIX No. XV—continued.

ABSTRACT No. 9, showing the Admissions into Hospital and Deaths, among the Troops serving in the Mediterranean during the year 1871; and the Disabilities of the Invalids sent to England and of those discharged the service in Malta and at Netley during the same period.

Stations	Gibraltar.		Malta.		Malta Fencible Artillery.		Gibraltar.		Malta.	
	Strength		4,428		4,977		568		Invalids.	
Diseases.										
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home.	Discharged at Netley.	Sent Home.	Discharged at Netley.
I. General Diseases.										
1. Febrile:										
Small Pox	14	..	66	12	6	1	..	..	..	..
Cow Pox	3	..	10	..	..	..	..	..	..	..
Chicken Pox .. .. .	..	..	4	..	1	..	..	..	..	..
Scarlet Fever	7	1	..	..	..	..	..	..	..	..
Typhus .. .. .	..	..	1	1	..	..	..	..	..	..
Enteric	15	7	16	9	..	..	1	..	1	..
Simple Continued Fever ..	116	1	357	4	11	..	3	..	2	..
Febricula	169	..	202	..	24	..	5	..	..	..
Ague	6	..	5	..	2	..	..	..	..	..
Remittent Fever	27	..	9	1	..	..	..	..	..	..
Influenza	18	..	6	..	..	..	..	..	..	..
Erysipelas	11	..	9	..	1	..	..	..	..	..
Mumps	6	..	8	..	..	..	..	..	..	..
Diphtheria .. .. .	..	..	3	..	..	..	..	..	..	..
2. Constitutional:										
Acute Rheumatism	29	..	92	..	1	..	1	..	2	..
Chronic	122	..	86	..	1	..	22	7	17	4
Muscular	30	..	78	..	18	..	..	1	..	..
Primary Syphilis	88	..	41	..	18	..	..	..	..	..
Secondary	37	1	26	..	6	..	2	2	4	2
Cancer .. .. .	..	..	1	1	1	..	..	..	1	..
Scrofula	3	..	6	..	..	..	1	1	4	3
Phthisis Pulmonalis	29	2	22	3	1	1	19	27	22	26
Hæmoptysis (Tubercular) ..	9	..	6	1	4	..	1	..	2	..
Morbus Coxarius	1	..	..	..	..	..	..	..	..	..
Purpura	1	..	..	..	..	..	..	..	..	1
Anæmia	7	..	6	..	..	..	5	2	2	..
Gout	1	..	1	..	..	..	..	..	..	..
Sebaceous Tumour	1	..	..	..	..	..	..	..	..	..
II. Local Diseases.										
1. Of the Nervous System:										
Encephalitis	2	..	1	..	..	..	..	..	2	..
Meningitis .. .. .	..	..	1	1	..	..	..	..	..	..
Apoplexy	1	1	..	..	..	..	..	..	..	..
Sunstroke	2	..	1	..	..	..	..	..	2	..
Paralysis	1	..	2	1	..	..	1	1	..	1
Locomotor Ataxy .. .. .	..	..	..	..	..	..	..	1	..	..
Epilepsy	7	..	12	..	3	..	5	3	1	1
Chorea	2	..	..	..	..	..	2	2	..	..
Hysteria	1	..	1	..	..	..	..	..	..	..

Abstract No. 9—continued.

Stations	Gibraltar.		Malta.		Malta Fencible Artillery.		Gibraltar.		Malta.		
Strength	4,428		4,977		563		Invalids.		Invalids.		
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home.	Discharged at Netley.	Sent Home.	Discharged at Malta.	Discharged at Netley.
Neuralgia	14	..	18	..	1	..	1	1	..	..	..
Dementia	6	..	3	..	2	..	3	..	2	..	..
2. Of the Eye :											
Scleritis .. .. .	..	..	..	..	..	..	..	..	1	..	..
Conjunctivitis	68	..	124	..	86	..	4	..	1	..	..
Tarsal Ophthalmia	5	..	3	..	..	..	1	1	..	..	..
Short Sight	1	..	..	..	..	..	2	2	1	3	4
Retinitis	2	..	3	..	..	..	2	..	1	..	..
Amaurosis	1	..	2	..	..	..	1	..	1	..	..
Cataract .. .. .	..	..	..	..	..	..	..	..	..	..	1
Glaucoma	1	..	..	..	..	..	1	1	..	..	..
Ulcer of Cornea	4	..	3	..	..	..	1	..	..	..	1
Keratitis	7	..	..	..	..	..	1	..	..	..	1
Iritis	1	..	1	..	..	..	..	..	..	..	..
Lachrymal Obstruction	1	..	..	..	..	..	..	..	..	..	..
Hordeolum .. .. .	..	..	1	..	2	..	..	..	..	..	..
Trichiasis .. .. .	..	..	2	..	..	..	..	..	1	..	1
Purulent Ophthalmia .. .. .	..	..	..	..	1	..	..	..	..	..	..
Gonorrhoeal .. .. .	..	..	..	..	1	..	..	..	..	..	..
Opacity of Cornea .. .. .	..	..	..	..	1	..	1	..	..	..	..
Staphyloma .. .. .	..	..	..	..	..	..	..	1	..	..	..
3. Of the Ear :											
Inflam: Membr: Tympani	6	..	3	..	..	..	..	..	..	..	..
Deafness	5	..	2	..	..	..	1	1	1	..	..
Otorrhoea	1	..	..	..	..	..	..	..	..	..	..
Inflam: External Meatus	12	..	9	..	..	..	..	..	..	..	..
Tumour	1	..	..	..	..	..	..	..	..	..	..
Abscess External Meatus .. .. .	..	..	1	..	..	..	..	..	..	..	..
Accumulation of Wax .. .. .	..	..	1	..	..	..	..	..	..	..	..
4. Of the Nose :											
Epistaxis	4	..	5	..	1	..	..	..	..	..	..
Ozena	1	..	..	..	..	..	..	..	..	..	..
5. Circulatory System :											
Pericarditis .. .. .	..	..	1	1	..	..	..	..	..	..	..
Valve Disease of Heart	4	..	4	1	..	..	4	5	1	..	2
Hypertrophy	6	..	1	..	..	..	5	5	..	..	3
Dilatation .. .. .	..	..	..	..	..	..	..	..	..	..	1
Fatty Degeneratn. of Heart	1	1	..	..	..	..	..	..	..	..	..
Aneurism of Heart	3	..	..	..	..	..	1	..	..	..	..
Angina Pectoris	1	..	1	..	..	..	..	..	..	..	..
Palpitation	25	..	12	..	..	..	7	7	5	..	..
Aneurism of Aorta	5	1	2	2	..	1	..	1	1	..	..
Atheroma of Aorta .. .. .	..	1	1	1	..	..	..	..	..	..	..
Aneurism	1	2	2	..	..	..	..	..	1	..	..
Varicose Veins	4	..	..	..	..	..	2	1	..	..	1
Fibrinous Concretions in Cavities of Heart .. .. .	..	..	1	1	..	..	..	..	..	..	..

Abstract No. 9—continued.

Stations	Gibraltar.		Malta.		Malta Fencible Artillery.		Gibraltar.		Malta.		
Strength	4,428		4,977		563		Invalids.		Invalids.		
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home.	Discharged at Netley.	Sent Home.	Discharged at Malta.	Discharged at Netley.
6. Absorbent System :											
Inflam: of Glands	11	..	14	..	3	..	..	..	..	..	..
Suppuration "	2	..	4	..	..	..	..	..	..	..	..
Inflam: of Lymphatics ..	1	..	..	..	..	..	..	..	..	..	..
7. Of Ductless Glands :											
Goitre	2	..	..	..	..	..	..	..	..	..	..
8. Respiratory System :											
Coryza	1	..	1	..	..	..	..	..	..	..	..
Laryngitis .. .. .	..	..	4	..	..	..	..	..	..	..	..
Bronchitis	172	1	197	2	16	..	11	1	12	1	2
Asthma	3	..	2	..	..	..	..	..	2	..	..
Pneumonia	8	1	17	4	..	..	..	1	2	..	1
Pleurisy	9	1	10	..	..	..	..	..	1	..	2
9. Digestive System :											
Tonsillitis	98	..	117	..	25	..	..	..	..	..	..
Gastritis .. .. .	..	..	..	1	2	..	..	..	..	..	..
Dyspepsia	119	..	214	..	56	..	2	..	2	..	1
Enteritis .. .. .	..	..	1	..	..	..	..	..	..	..	..
Dysentery	12	..	13	..	..	..	1	1	1	..	1
Diarrhœa	69	..	100	..	16	..	1	..	2	..	1
Hernia	4	..	8	..	..	..	2	1	3	1	3
Colic	15	..	21	..	2	..	..	..	..	..	..
Tænia Solium	7	..	67	..	..	..	..	..	..	..	..
Constipation .. .. .	..	..	3	..	..	..	..	..	..	..	..
Fistula in Ano	1	..	8	..	..	..	..	..	..	..	..
Hæmorrhoids	24	..	15	..	..	..	1	2	..	..	..
Hepatitis	16	..	26	2	..	..	4	3	7	..	6
Jaundice	14	..	44	1	..	..	..	..	..	..	..
Splenitis	1	..	..	..	..	..	1	..	..	..	1
Ascites .. .. .	..	..	1	1	..	..	..	..	..	..	..
Ranula	2	..	5	..	..	..	..	..	..	..	..
Gum Boil	1	..	8	..	..	..	..	..	..	..	..
Relaxed Throat	4	..	1	..	..	..	..	..	..	..	..
Caries of Alveoli .. ..	..	..	1	..	..	..	..	..	..	..	..
Inflam: Dental Periosteum	..	..	1	..	..	..	..	..	..	..	..
Ulcer of Tongue .. ..	..	..	1	..	..	..	..	..	..	..	..
Quinsy .. .. .	..	..	1	..	..	..	..	..	..	..	..
Abscess of Pharynx .. ..	..	..	1	..	..	..	..	..	..	..	..
Hæmatemesia .. .. .	..	..	1	..	..	..	..	..	..	..	..
Perforation of Intestines	..	..	1	1	..	..	..	..	..	..	..
Tænia Mediocanellata ..	..	..	3	..	..	..	..	..	..	..	..
Prolapsus Ani .. .. .	..	..	1	..	..	..	..	..	..	..	..
Condyloma of Anus .. ..	..	..	1	..	..	..	..	..	..	..	..
10. Urinary System :											
Bright's Disease	1	..	1	..	..	..	1	1	1	..	3
Nephritis	4	1	2	..	..	..	1	..	..	..	..

Abstract No. 9—continued.

Stations	Gibraltar.		Malta.		Malta Fencible Artillery.		Gibraltar.		Malta.		
Strength	4,428		4,977		563		Invalids.		Invalids.		
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home.	Discharged at Netley.	Sent Home.	Discharged at Malta.	Discharged at Netley.
Gonorrhoea	326	..	168	..	49	..	..	..	..	..	..
Phimosis, &c.	2	..	1	..	..	..	..	..	..	..	..
Bubo	8	..	..	..	..	..	..	..	..	..	..
Epididymitis, Gonorrhoeal ..	11	..	6	..	1	..	..	..	..	..	..
Stricture of Urethra	9	1	8	..	1	..	1	1	1	..	1
Urinary Fistula	1	..	..	..	..	..	..	..	..	..	..
Diuresis	1	..	..	..	..	..	..	..	..	..	..
Cystitis	1	..	..	..	..	..	..	..	..	..	..
Stone in Bladder	1	..	..	..	..	..	..	..	..	..	..
Condyloma	1	..	..	..	..	..	..	..	..	..	..
Irritability of Bladder	1	..	..	..	..	..	..	..	..	..	..
Hæmaturia Renalis .. ..	..	..	1	..	..	..	..	..	..	..	..
Incontinence of Urine .. ..	..	..	4	..	..	..	..	..	1	..	1
Warts .. .. .	..	..	2	..	..	..	..	..	..	..	..
Retention of Urine .. ..	..	..	1	..	..	..	..	..	..	..	..
Calculus in Bladder .. ..	..	..	2	..	..	..	..	..	1	..	..
11. Generative System :											
Varicocele	1	..	..	..	..	..	1	..	..	..	..
Hydrocele	4	..	1	..	3	..	1	..	..	..	..
Orchitis	75	..	54	..	1	..	..	1	..	..	..
Spermatorrhœa	1	..	..	..	..	..	..	..	..	..	..
Protrusion of Tubuli .. ..	..	..	..	..	..	..	..	..	..	..	1
12. Organs of Locomotion :											
Ostitis	11	..	7	..	..	..	1	..	1	..	..
Necrosis .. .. .	..	..	1	..	..	..	..	1	..	..	..
Synovitis	7	..	7	..	..	..	..	..	..	..	..
Bursal Abscess	6	..	..	..	..	..	..	..	..	..	..
Inflam: of Hand	1	..	..	..	..	..	..	..	..	..	..
" Toe	2	..	..	..	..	..	..	..	..	..	..
Loose Cartilage .. .. .	..	..	1	..	..	..	..	..	1	..	..
Lumbar Abscess .. .. .	..	..	1	..	..	..	..	..	1	..	..
Bunion .. .. .	..	..	1	..	..	..	..	..	..	..	..
Ganglion .. .. .	..	..	2	..	..	..	..	..	..	..	..
Contraction .. .. .	..	..	..	..	..	..	..	1	..	..	..
13. Of Cellular Tissue :											
Inflam. of Cellular Tissue ..	1	..	40	..	20	..	..	..	..	..	..
Abscess " "	72	..	83	..	..	..	..	1	1	..	..
14. Cutaneous System :											
Urticaria .. .. .	..	..	1	..	..	..	..	..	..	..	..
Lichen .. .. .	..	..	4	..	..	..	..	..	..	..	..
Psoriasis	6	..	12	..	..	..	..	..	..	..	..
Herpes	6	..	7	..	..	..	..	..	..	..	..
Eczema	21	..	38	..	..	..	1	..	1	..	1
Impetigo	1	..	1	..	..	..	..	..	..	..	..
Ulcer	86	..	73	..	26	..	3	..	1	1	1
Boil	155	..	146	..	19	..	..	..	..	..	..
Carbuncle .. .. .	..	..	7	..	1	..	..	..	..	..	..

Abstract No. 9—continued.

Stations	Gibraltar.		Malta.		Malta Fencible Artillery.		Gibraltar.		Malta.		
Strength	4,428		4,977		563		Invalids.		Invalids.		
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home.	Discharged at Netley.	Sent Home.	Discharged at Malta.	Discharged at Netley.
Whitlow	15	..	18	..	1	..	..	..	..	..	..
Itch	9	..	8	..	1	..	..	..	..	..	..
Warts	22	..	2	..	..	..	..	..	..	..	..
Pemphigus	1	..	..	..	..	..	..	..	..	..	..
Corns	1	..	1	..	..	..	..	..	..	..	..
Acne	1	..	..	..	..	..	..	..	..	..	..
Ringworm	6	..	..	..	..	..	..	..	..	..	..
Tinea	5	..	6	..	..	..	1	..	..	..	..
Ingrown Nail	2	..	1	..	..	..	..	..	..	..	..
Erythema .. .. .	..	..	1	..	1	..	..	..	..	..	..
Prurigo .. .. .	..	..	8	..	..	..	..	..	..	..	..
Sycosis .. .. .	..	..	1	..	..	..	..	..	..	..	..
Irritation from a Sting .. .. .	..	..	1	..	..	..	..	..	..	..	..
III. Conditions, &c.											
General Detility	30	..	20	..	1	..	10	2	9	1	1
IV. Poisons.											
Delirium Tremens	11	..	20	1	1	..	..	..	..	..	..
Alcohol	7	..	72	..	..	..	..	..	..	..	..
V. Injuries.											
2. Accidental:											
Burns and Scalds	8	..	2	..	..	..	..	..	..	..	..
Asphyxia by Drowning .. .. .	..	..	..	2	..	..	..	..	..	..	..
Contusion	238	..	211	..	5	..	1	..	1	..	..
Concussion of the Brain	1	..	..	..	..	..	..	..	..	..	..
Fracture	19	..	12	1	2	..	3	4	1	..	..
Wounds	108	..	116	..	5	..	1	..	1	..	..
Sprain	113	..	132	..	1	..	..	..	..	..	..
Dislocation	7	..	8	..	..	..	..	..	..	..	..
Blisters of the Feet	13	..	11	..	..	..	..	..	..	..	..
3. Homicidal:											
Wound .. .. .	..	..	1	..	..	..	..	..	..	..	..
4. Self-inflicted:											
Poison	1	1	..	..	..	..	..	..	..	..	..
Cut-throat .. .. .	..	..	2	..	..	..	..	..	1	..	..
5. Judicial:											
Flogging .. .. .	..	..	1	..	..	..	..	..	..	..	..
VI. Surgical Operations.											
Amputation of Finger	1	..	..	..	..	..	..	..	..	..	..
No appreciable Disease	1	..	5	..	..	..	..	..	..	..	..
Total	2,996	24	3,531	56	452	3	155	94	133	9	79

Abstract No. 9—*continued*.

CAUSES of the Deaths among the Invalids.

	From Gibraltar.	From Malta.
Phthisis Pulmonalis	3	3
Apoplexy	1	..
Valve Disease of Heart .. ..	..	1
Pulmonary Extravasation .. ..	..	1
Bright's Disease	1	..
Total	2	5

ARMY MEDICAL DEPARTMENT.

APPENDIX No. XV—continued.

ABSTRACT No. 10, showing the Ages of the Troops serving in the Mediterranean, and the Deaths at each Age, during the Year 1871.

Station.	Corps.	Under 20 Years.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.		Total.	
		Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.
Gibraltar	Royal Artillery	37	..	160	1	202	1	188	2	98	..	9	..	694	4
	Royal Engineers	6	..	76	..	69	1	76	1	39	..	3	..	289	4
	1st Battalion 13th Regiment	23	..	254	2	141	..	142	2	55	..	7	..	621	4
	28th Regiment	96	..	254	..	109	1	137	1	69	..	14	..	679	4
	71st "	37	1	239	..	145	..	117	..	74	..	..	..	642	2
	74th "	..	..	296	..	185	..	64	..	36	..	4	..	615	1
	81st "	80	..	236	1	87	..	123	1	61	..	..	..	587	5
	Royal Artillery	40	..	175	6	192	5	191	4	92	..	25	3	715	17
	Royal Engineers	4	..	30	..	65	1	56	..	18	..	5	..	178	5
	1st Battalion 24th Regiment	29	..	291	1	145	2	74	1	55	..	5	..	599	5
Malta ..	31st Regiment	11	..	221	2	155	1	167	3	81	1	15	..	650	7
	48th "	39	1	306	2	154	4	114	2	43	..	11	..	672	9
	52nd "	29	..	314	2	134	..	98	3	72	..	4	..	651	7
	64th "	18	..	200	2	152	..	132	2	59	3	13	1	574	9
	87th "	20	1	162	1	141	..	126	1	107	1	18	..	574	4
Total ..		558	3	3,334	21	2,026	19	1,805	25	964	12	138	3	8,720	88

APPENDIX No. XV—continued.

ABSTRACT No. 11, showing the Admissions into Hospital and Deaths among the Troops serving in the Dominion of Canada and in Bermuda during the Year 1871; and the Number of Invalids sent home from these Colonies, and of Men finally discharged the Service in them and at Netley during the same period.

Stations	Dominion of Canada.		Bermuda.		Invalids.				
Average Annual Strength	2,388		1,783		Sent home from—		Discharged in Canada.	Discharged at Netley from—	
Diseases.	Admitted.	Died.	Admitted.	Died.	Canada.	Bermuda.		Canada.	Bermuda.
I. General Diseases.									
1. Febrile:									
Chicken Pox	1	..	..	..	..	..	..	..	..
Measles	2	..	..	..	..	..	..	..	..
Scarlet Fever	5	..	..	..	..	..	..	..	..
Enteric	1	..	11	5	..	..	..	..	..
Simple Continued Fever..	10	1	50	..	..	..	..	..	..
Febricula	8	..	36	..	..	..	..	..	..
Ague	4	..	2	..	..	..	..	..	..
Influenza	33	..	24	..	..	..	..	..	..
Erysipelas.. ..	13	..	1	..	..	..	..	..	..
2. Constitutional:									
Acute Rheumatism	61	..	26	..	..	1	..	..	..
Chronic	27	..	26	..	3	2	..	..	3
Muscular	23	..	5	..	2	..	..	..	..
Gonorrhoeal	3	..	..	..	..	..	..	..	..
Chronic Osteo-Arthritis ..	..	..	1	..	..	1	..	..	..
Primary Syphilis	98	..	38	..	..	..	..	..	..
Secondary	79	..	17	1	6	1	..	4	..
Scrofula	1	..	5	..	1	1	..	..	2
Phthisis Pulmonalis	7	1	15	7	4	8	1	5	8
Hæmoptysis (Tubercular)	5	..	1	..	1	..	..	1	..
Scurvy	1	..	..	..	..	..	..	..	..
Anæmia	1	..	..	..	..	..	..	..	..
General Dropsy	1	..	..	..	..	..	..	..	..
II. Local Diseases.									
1. Nervous System:									
Encephalitis .. ..	..	..	1	..	..	..	..	..	..
Meningitis .. ..	..	..	2	..	..	..	..	..	..
Apoplexy	1	2	..	..	..	..	..	..	..
Sun Stroke	1	..	2	..	..	..	..	..	..
Paralysis	6	1	3	1	..	1	..	..	..
Locomotor Ataxy .. ..	..	..	..	..	..	..	..	..	1
Epilepsy	7	..	2	..	2	..	2	..	1
Neuralgia	15	..	3	..	..	..	..	..	..
Mania	2	..	..	..	1	..	..	..	..
Dementia	2	..	5	..	2	5	..	..	..
2. Diseases of the Eye:									
Conjunctivitis	9	..	20	..	..	2	..	..	..
Tarsal Ophthalmia	4	..	4	..	..	..	..	1	..

Abstract No. 11—continued.

Stations	Dominion of Canada.		Bermuda.		Invalids.				
Average Annual Strength	2,383		1,733		Sent home from—		Discharged in Canada.	Discharged at Netley from—	
Diseases.	Admitted.	Died.	Admitted.	Died.	Canada.	Bermuda.		Canada.	Bermuda.
Keratitis	1	..	..	..	..	..	..	..	..
Ulcer of Cornea .. .. .	..	..	2	..	..	..	..	..	..
Iritis	1	..	..	..	..	..	..	..	..
Impaired Vision	2	..	..	..	..	..	1	..	..
Amaurosis	1	..	1	..	..	..	..	..	..
Cataract .. .. .	..	..	1	..	..	1	..	..	1
Short Sight .. .. .	..	..	1	..	..	..	..	..	..
Night Blindness .. .. .	..	..	1	..	..	1	..	..	..
3. Diseases of the Ear :									
Inflam: Membr: Tympani ..	..	..	2	..	..	..	..	..	..
Inflam: Extl. Meatus ..	1	..	1	..	..	..	..	..	..
Deafness	1	..	2	..	..	..	..	..	..
Polypus .. .. .	..	..	1	..	..	..	..	..	..
4. Diseases of the Nose :									
Epistaxis	3	..	..	..	..	..	..	..	..
5. Circulatory System :									
Pericarditis	1	..	1	..	..	..	..	..	..
Valve Disease of Heart ..	6	..	3	1	4	2	1	2	..
Hypertrophy .. .. .	..	..	8	..	..	2	..	..	2
Fatty Degeneration ..	1	1	..	..	..	..	..	..	..
Palpitation	3	..	1	..	..	..	..	..	1
Aneurism of Aorta .. ..	..	1	2	1	1	..	..	1	..
Aneurism	2	..	..	..	..	..	..	..	..
Varicose Veins	4	..	..	..	..	..	1	..	..
6. Absorbent System :									
Inflam: of Glands	33	..	13	..	..	..	..	..	..
Suppuration	6	..	3	..	..	..	..	..	..
8. Respiratory System :									
Laryngitis	1	..	..	..	..	..	..	..	..
Bronchitis	154	..	46	..	3	1	1	..	1
Asthma	7	..	3	..	..	3	..	..	1
Pneumonia	19	4	4	1	..	..	..	..	..
Pleurisy	7	..	6	..	..	..	2	..	1
Aphonia .. .. .	..	..	1	..	..	..	..	..	..
9. Digestive System :									
Ulcerated Throat	5	..	..	..	..	..	..	..	..
Stomatitis	3	..	..	..	..	..	..	..	..
Abscess of Cheek	1	..	..	..	..	..	..	..	..
Gum Boil	9	..	..	..	..	..	..	..	..
Tonsillitis	48	..	12	..	..	..	..	..	..
Gastritis .. .. .	..	..	2	..	..	1	..	..	..
Dyspepsia	71	..	103	..	..	..	..	..	..
Enteritis .. .. .	..	..	1	1	..	..	..	..	..
Dysentery	1	..	15	..	..	1	..	..	..
Diarrhoea	29	..	109	..	..	..	..	..	..
Hernia	11	..	..	..	1	1	3	..	1
Colic	3	..	5	..	..	..	..	..	..
Tania Solium	4	..	..	..	..	..	..	..	..

Abstract No: 11—continued.

Stations	Dominion of Canada.		Bermuda.		Invalids.				
Average Annual Strength	2,883		1,783		Sent home from—		Discharged in Canada.	Discharged at Netley from—	
Diseases.	Admitted.	Died.	Admitted.	Died.	Canada.	Bermuda.		Canada.	Bermuda.
Ascaris Lumbricoides ..	1	..	..	..	..	..	..	..	..
Constipation	1	..	4	..	..	..	..	..	..
Fistula in Ano	1	..	4	..	..	..	..	..	..
Hæmorrhoids	13	..	6	..	..	..	..	..	..
Condyloma	8	..	..	..	..	..	..	..	..
Fissure of Anus .. ..	..	..	1	..	..	..	..	..	..
Hepatitis	12	1	6	..	1	2	1	1	..
Fatty Liver .. ..	..	..	1	1	..	..	..	..	..
Jaundice	2	..	..	..	..	..	..	..	..
Splenitis	2	..	..	..	..	..	..	..	..
Peritonitis.. ..	1	..	..	..	..	..	..	..	..
10. Urinary System :									
Bright's Disease .. ..	..	..	..	..	..	1	..	..	..
Nephritis	1	1	1	..	..	..	..	..	..
Gonorrhœa	141	..	51	..	..	..	..	..	..
Warts, Gonorrhœal .. ..	..	..	1	..	..	..	..	..	..
Phymosis, &c. .. ..	..	..	2	..	..	..	..	..	..
Bubo	9	..	4	..	..	..	..	..	..
Epididymitis, Gonorrhœal	12	..	2	..	..	..	..	..	..
Stricture of Urethra ..	4	..	4	..	..	..	..	..	..
Diuresis	2	..	..	..	..	..	..	..	..
Incontinence of Urine ..	1	..	..	..	..	..	..	..	..
11. Generative System :									
Hydrocele	5	..	1	..	1	..	..	..	..
Orchitis	29	..	15	..	..	..	..	1	..
12. Organs of Locomotion:									
Ostitis	2	..	..	..	..	..	..	..	..
Necrosis	2	..	..	..	..	..	..	2	..
Synovitis	2	..	1	..	..	..	1	..	..
Contraction of Tendons ..	2	..	..	..	2	..	..	1	..
Bunion	4	..	..	..	..	..	..	..	..
Atrophy of Muscle .. ..	..	..	..	..	..	1	..	..	1
Deformity of Spine ..	..	..	..	..	..	..	..	..	1
13. Diseases of Cellular Tissue :									
Inflam : of Cellular Tissue	10	..	10	..	..	..	..	..	..
Abcess	40	..	68	..	..	..	..	..	..
14. Cutaneous System :									
Lichen .. ..	..	..	1	..	..	..	..	..	..
Psoriasis	2	..	1	..	..	..	..	..	..
Herpes	3	..	1	..	..	..	..	..	..
Eczema	14	..	13	..	..	..	..	..	..
Impetigo .. ..	..	..	1	..	..	..	..	..	..
Tinea	4	..	1	..	..	..	..	..	..
Rosœola	1	..	..	..	..	..	..	..	..
Pemphigus .. ..	..	..	1	..	..	..	..	..	..
Ulcer	77	..	56	..	..	..	..	..	..

Abstract No. 11—continued.

Stations	Dominion of Canada.		Bermuda.		Invalids.			
Average Annual Strength	2,383		1,733		Sent home from—		Discharged at Netley from—	
Diseases.	Admitted.	Died.	Admitted.	Died.	Canada.	Bermuda.	Discharged in Canada.	Discharged at Netley.
Boil	30	..	18	..	..	..	..	..
Carbuncle	3	..	1	1	..	..	..	..
Whitlow	7	..	5	..	..	..	..	..
Itch	1	..	..	..	..	..	..	..
Warts	4	..	2	..	..	..	..	..
Tumours	2	..	1	..	..	..	..	..
Frost Bite	16	..	..	..	1	..	..	1
Chilblain	1	..	..	..	..	..	..	..
III. Conditions, &c.								
General Debility	25	..	15	..	4	2	1	..
IV. Poisons.								
Delirium Tremens	11	..	12	1	..	..	..	..
Alcohol	8	1	4	2	..	..	..	..
V. Injuries.								
2. Accidental:								
Burns and Scalds	16	..	3	..	..	..	..	..
Multiple Injury .. .. .	..	1	2	..	..	1	..	..
Asphyxia by Drowning .. .. .	..	..	3	..	..	..	..	..
Contusion	132	..	100	..	1	..	..	..
Fracture	6	..	8	..	..	1	1	1
Wounds	27	..	53	..	..	..	..	..
" from Gunshot	1	..	..	..	..	..	..	..
Sprain	46	..	26	..	..	1	..	..
Dislocation	2	..	3	..	..	1	..	1
Blisters of the Feet	6	..	5	..	..	..	..	..
3. Homicidal:								
Wound of Head	1	1	..	..	..	..	..	..
4. Self-inflicted:								
Out throat	1	1	2	1	..	..	..	..
Poison .. .. .	..	..	..	1	..	..	..	..
VI. Surgical Operations.								
Amputation of Thigh	1	..	..	..	1	..	..	1
Total	1,620	17	1,162	28	42	45	16	21

CAUSES of the Deaths of the Invalids.

Diseases.	Dominion of Canada.	Bermuda.
Phthisis .. .. .	..	2
Apoplexy .. .. .	..	1
Mollities Ossium	1	..
Total	1	3

APPENDIX No. XV—continued.

ABSTRACT No. 12, showing the Ages of the Troops serving in the Dominion of Canada and in Bermuda, and the Deaths at each Age, during the Year 1871.

	Corps.	Under 20.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.		Total	
		Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.	Strength on 1st January.	Died.
Canada	3rd Brigade Royal Artillery	10	..	119	..	125	..	35	3	11	1	12	..	312	4
	Engineers ..	2	..	35	..	37	..	28	..	18	1	2	..	112	1
	1st Battalion 60th Foot ..	15	..	153	..	188	1	274	2	107	1	8	1	745	5
	61st Foot ..	162	..	147	1	150	2	125	..	45	..	..	..	629	3
	Total ..	189	..	444	1	500	3	462	5	181	3	22	1	1,798	13
Bermuda	3rd Brigade Royal Artillery	6	..	16	..	45	..	56	2	34	2	1	..	158	4
	Engineers ..	18	..	79	1	72	1	71	5	35	3	2	..	272	5
	53rd Foot ..	172	..	198	4	158	2	95	1	22	2	..	..	645	13
	69th ..	20	..	295	2	174	1	120	2	50	1	6	..	665	6
	Total ..	211	..	588	7	449	3	342	10	141	8	9	..	1,740	28

APPENDIX No. XV—continued.

ABSTRACT No. 13, showing the Admissions into Hospital, and Deaths, among the White Troops serving in the Windward and Leeward Command and Jamaica, in the Year 1871; the disabilities of the Invalids sent home and of those Discharged the Service at Netley during the same period.

Stations	Windward and Leeward Command.		Jamaica.		Invalids.			
	670		296		Sent Home from		Discharged at Netley from	
Diseases.	Admitted.	Died.	Admitted.	Died.	West Indies.	Jamaica.	West Indies.	Jamaica.
I. General Diseases.								
1. Febrile:								
Simple Continued Fever ..	81	..	20	..	..	..	..	..
Febricula	3	..	..	..	..	..	..	..
Ague	5	..	2	..	..	1	..	..
Remittent Fever	8	..	10	1	..	..	..	..
Simple Cholera	2	..	..	..	..	..	..	..
Mumps	2	..	..	..	..	..	..	..
Influenza	1	..	..	..	..	..	..	..
Erysipelas	1	..	2	..	..	..	..	..
2. Constitutional:								
Acute Rheumatism ..	5	..	7	..	..	..	..	..
Chronic	1	..	3	..	..	..	..	..
Muscular	2	..	..	..	..	..	..	..
Primary Syphilis ..	30	..	11	..	..	..	..	..
Secondary	13	..	1	..	..	..	..	..
Cancer .. .. .	..	..	..	..	..	..	1	..
Phthisis Pulmonalis ..	3	..	2	1	3	1	4	2
Hæmoptysis (Tub.) ..	2	..	..	..	1	..	..	..
II. Local Diseases.								
1. Of the Nervous Syst.:								
Sunstroke .. .. .	..	..	1	..	..	..	..	..
Locomotor Ataxy ..	1	..	..	..	..	..	..	..
Epilepsy	3	..	..	..	..	..	..	..
Neuralgia	1	..	1	..	..	..	..	..
Dementia .. .. .	..	..	1	..	..	..	..	..
2. Of the Eye:								
Conjunctivitis	7	..	1	..	1	..	..	..
Tarsal Ophthalmia ..	..	..	2	..	..	..	..	..
Impaired Vision ..	..	..	..	..	..	..	1	..
Short Sight.. .. .	..	..	..	..	1	..	..	..
Hemeralopia	1	..	..	..	1	..	1	..
3. Of the Ear:								
Inflam: Ext: Meatus ..	1	..	..	..	..	..	..	..
Otorrhœa .. .. .	..	..	..	..	..	1	..	..
Deafness	1	..	..	..	..	..	..	..
Disease of Mastoid Cells ..	..	..	..	..	..	..	..	1
5. Circulatory System:								
Hypertrophy of Heart ..	..	..	3	..	..	1	1	..
Aneurism .. .. .	..	..	..	1	..	..	..	..
Partial Degent: of Heart ..	..	..	1	1	..	..	..	..
Palpitation	6	..	1	..	..	..	..	..

Abstract No. 13—*continued.*

Stations	Windward and Leeward Command.		Jamaica.		Invalids.			
	Strength		296		Sent Home from		Discharged at Netley from	
Diseases.	Admitted.	Died.	Admitted.	Died.	West Indies.	Jamaica.	West Indies.	Jamaica.
6. Absorbent System :								
Inflammation of Glands ..	16	..	2	..	..	..	..	..
8. Respiratory System :								
Coryza .. .. .	..	..	1	..	..	..	..	..
Bronchitis	12	..	7	..	..	1	1	..
Asthma	1	..	5	..	..	1	..	..
Pneumonia	1	..	1	..	..	..	..	..
9. Digestive System :								
Stomatitis .. .. .	..	..	1	..	..	..	..	..
Inflammation of Gums ..	..	..	1	..	..	..	..	..
Tonsillitis	9	..	2	..	..	..	..	..
Hæmatemesis	1	..	1	..	..	..	..	..
Dyspepsia	13	..	1	..	..	..	..	..
Dysentery .. .. .	..	..	1	..	..	1	..	..
Diarrhoea	21	..	3	..	..	..	..	..
Hernia .. .. .	..	..	..	..	..	..	1	..
Constipation .. .. .	..	..	1	..	..	..	..	..
Fistula in Ano .. .. .	..	..	3	..	..	1	..	..
Hæmorrhoids	2	..	1	..	..	..	..	..
Hepatitis	8	..	4	..	..	..	..	..
10. Urinary System :								
Gonorrhoea	131	..	12	..	..	..	..	..
Phimosis, &c.	5	..	..	..	..	..	..	..
Bubo	4	..	1	..	..	..	..	..
Epididymitis Gonorrhoeal ..	1	..	..	..	..	..	..	..
Stricture of Urethra ..	..	..	1	..	..	..	..	..
11. Generative System :								
Hydrocele	1	..	2	..	..	..	..	..
Orchitis	7	..	1	..	..	..	..	..
12. Organs of Locomotion :								
Synovitis	2	..	1	..	..	..	..	..
Enlarged Bursa Patellæ ..	1	..	..	..	..	..	..	..
13. Of Cellular Tissue :								
Inflam. of Cellular Tissue ..	3	..	..	..	..	..	..	..
Abscess	12	..	2	..	..	..	..	..
14. Cutaneous System :								
Psoriasis .. .. .	..	..	1	..	..	..	..	..
Herpes	5	..	..	..	..	..	..	..
Eczema	9	..	1	..	..	..	..	..
Sycosis	2	..	..	..	..	..	..	..
Ulcer	29	..	12	..	..	..	..	..
Boil.. .. .	4	..	8	..	..	..	..	..

Abstract No. 13—continued.

Stations	Windward and Leeward Command.	Jamaica.		Invalids.				
				Sent Home from		Discharged at Netley from		
Strength	670	296						
Diseases.	Admitted.	Died.	Admitted.	Died.	West Indies.	Jamaica.	West Indies.	Jamaica.
Carbuncle	2	..	..	..	..	..	..	..
Whitlow	2	..	..	..	..	..	..	..
Warts	1	..	..	..	..	..	..	..
Ingrown Nails	3	..	5	..	..	..	..	..
Finea	1	..	..	..	..	..	..	..
III. Conditions, &c.								
General Debility	6	..	5	..	..	1	1	..
IV. Poisons.								
Delirium Tremens.. ..	7	..	4	..	..	..	..	..
Alcohol	17	..	..	..	..	..	..	..
V. Injuries.								
2. Accidental:								
Burns and Scalds .. ..	..	..	1	..	..	..	..	..
Contusion	32	..	22	..	..	..	..	..
Fracture	2	..	..	..	..	..	1	..
Wounds	12	..	5	..	..	..	..	..
Sprain	16	..	9	..	..	..	..	..
Dislocation .. ..	..	..	2	..	..	..	..	..
Blisters of the Feet	5	..	..	..	..	..	..	..
Foreign Bodies in Cornea..	1	..	..	..	..	..	..	..
Chemical Injury to Eyes ..	1	..	..	..	..	..	..	..
4. Self-inflicted:								
Cut Throat .. ..	..	1	..	..	..	..	..	..
No appreciable Disease ..	1	..	..	..	..	..	..	..
Total	539	1	199	4	7	9	12	4

CAUSES OF DEATHS OF THE INVALIDS.

			Windward and Leeward Command.	Jamaica.
Phthisis Pulmonalis .. ..	..	..	1	..
Total .. ..	..	..	1	..

APPENDIX No. XV—continued.

ABSTRACT No. 14, showing the Admissions into Hospital, and Deaths, among the Black Troops serving in the Windward and Leeward Command, Jamaica, Honduras, Bahamas, and Western Africa, in the Year 1871, and the Disabilities of those Discharged the Service as Invalids during the same period, in the West Indies and Western Africa.

Stations	Windward and Leeward Command.		Jamaica.		Honduras.		Bahamas.		Western Africa.		Black Troops in West Indies and W. Africa.
Average Strength ..	718		548		187		145		320		1,908
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Discharged as Invalids.
I. General Diseases.											
1. Febrile:											
Cowpox	3	..	..	..	..	..	..	..	..	..	..
Chicken Pox	1	..	..	..	..	..	..	..	..	..	..
Measles .. ..	..	..	..	..	..	..	..	..	3	..	..
Simple Cont. Fever ..	3	..	47	1	..	..	2	..	..	..	..
Febricula	7	..	..	..	..	..	..	..	..	..	..
Ague	48	..	6	..	2	..	8	..	131	..	..
Remittent Fever	1	..	4	..	14	..	..	..	138	..	..
Mumps	19	..	..	..	2	..	1	..	13	..	..
Influenza	3	..	..	..	..	..	..	..	..	..	..
2. Constitutional:											
Acute Rheumatism ..	2	..	5	..	11	..	4	..	12	..	..
Chronic "	22	..	5	..	9	..	15	..	24	..	..
Muscular "	6	..	4	..	3	..	2	..	13	..	..
Primary Syphilis ..	50	..	88	..	3	..	23	..	18	..	..
Secondary "	9	..	15	1	3	..	6	..	7	..	..
Scrofula .. ..	..	..	3	..	..	..	..	..	..	..	..
Phthisis Pulmonalis	14	6	9	6	2	1	5	4	2	2	1
Hæmoptysis (Tub.) ..	1	..	..	..	..	..	1	..	..	..	..
Anæmia	1	..	..	..	2	..	..	..	..	..	..
General Dropsy .. ..	..	..	..	..	..	..	1	..	..	..	..
II. Local Diseases.											
1. Nervous System.											
Meningitis	1	..	..	..	..	..	..	..	..	..	..
Apoplexy .. ..	..	..	1	1	..	..	..	..	..	..	..
Paralysis .. ..	..	..	..	..	..	..	2	..	..	..	1
Tetanus	1	1	..	..	..	..	..	..	..	..	..
Epilepsy	3	..	1	1	..	..	1	..	2	1	1
Neuralgia	22	..	1	..	3	..	..	..	1	..	..
Mania	1	..	..	..	..	..	..	..	..	..	1
Dementia .. ..	..	..	6	..	1	..	1	..	..	..	..
2. Of the Eye:											
Conjunctivitis	12	..	4	..	5	..	1	..	13	..	..
Gon: Ophthalmia .. ..	..	..	1	..	..	..	1	..	..	..	..
Tarsal "	1	..	1	..	..	..	..	..	..	..	..
Iritis	2	..	..	..	..	..	..	..	..	..	..
Ulcer of Cornea .. ..	..	..	1	..	..	..	..	..	..	..	..
Pterygium .. ..	..	..	1	..	..	..	..	..	..	..	..

Abstract No. 14—continued.

Stations	Windward and Leeward Command.		Jamaica.		Honduras.		Bahamas.		Western Africa.		Black Troops in West Indies and W. Africa.
Average Strength ..	713		543		187		145		320		1,908
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Discharged as Invalids.
3. Of the Ear:											
Inflam: Memb: Tymp	1	..	..	..	..	..	..	4	..	..	..
Inflam: ext: Meatus:	..	..	..	..	..	..	1	..	..	..	..
Deafness .. ..	..	..	1	..	..	..	..	..	..	..	..
4. Of the Nose:											
Epistaxis .. ..	..	..	2	..	..	..	..	..	..	..	..
5. Circulatory Syst.											
Pericarditis	1	..	..	..	..	..	..	1	..	1*	..
Valve Dis: of Heart	4	2	..	..	..	..	1	..	..	..	..
Fatty Degn: of Heart	..	..	..	..	1	..	..	..	..	..	..
Palpitation	2	..	3	..	..	..	..	3	..	..	..
6. Absorbent Syst.											
Inflam: of Glands..	18	..	8	..	3	..	..	6	..	..	..
8. Respiratory Syst.:											
Bronchitis	22	1	21	1	5	..	14	..	15	..	..
Asthma	4	..	1	..	2	..	4	..	8	..	..
Pneumonia	4	2	6	1	..	..	2	..	2	..	..
Pleurisy	2	..	4	1	1	..	..	..	..	..	..
9. Digestive Syst.:											
Abscess of Antrum	2	..	..	..	..	..	..	..	..	..	..
Gum Boil	2	..	..	..	2	..	2	..	..	..	..
Tonsillitis	16	..	1	..	1	..	3	..	2	..	..
Dyspepsia	15	..	..	..	3	..	..	..	3	..	..
Dysentery	2	..	1	..	5	..	..	..	16	1	..
Diarrhoea	11	..	5	..	5	..	1	..	13	..	..
Hernia	5	..	..	..	..	..	..	..	3	..	..
Colic	5	..	1	..	1	..	2	..	..	..	..
Tænia Solium	1	..	1	..	1	..	..	..	..	..	..
Constipation	1	..	2	..	..	..	..	..	1	..	..
Fistula in Ano .. ..	..	..	1	..	..	..	..	..	..	..	..
Hæmorrhoids	1	..	..	..	..	..	..	..	2	..	..
Hepatitis	3	..	1	1	2	..	1	..	6	1	2
Jaundice	2	..	..	..	..	..	1	..	3	..	..
Splenitis	1	..	3	..	1	..	..	..	4	..	..
Peritonitis	1	1	..	..	..	..	..	..	..	..	..
Ascites .. ..	..	..	..	..	..	..	..	1	..	..	..
Obstr: of Vena Portæ	..	..	..	..	1	..	..	..	..	..	..
Ulceration of Throat	..	..	..	..	..	..	3	..	..	..	..
10. Urinary System:											
Bright's Disease ..	4	1	3	2	..	..	1	1	..	..	1
Nephritis	1	1	..	..	..	..	..	..	..	..	..
Cystitis	1	..	..	..	..	..	..	..	..	..	..
Retention of Urine..	1	..	..	..	..	..	..	..	..	..	..

Abstract No. 14—continued.

Stations	Windward and Leeward Command.		Jamaica.		Honduras.		Bahamas.		Western Africa.		Black Troops in West Indies and W. Africa.
Average Strength ..	713		543		187		145		320		1,908
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Discharged as Invalids.
Gonorrhœa ..	113	..	82	..	12	..	14	..	42	..	..
Phimosis, &c. ..	8	..	4	..	..	..	..	..	2	..	..
Bubo ..	..	..	11	..	..	..	3	..	..	..	..
Epididymitis Gon: ..	3	..	..	..	..	..	..	..	1	..	..
Stricture of Urethra	4	..	..	..	..	..	..	..	1	..	..
Hæmorr: from „	..	..	..	..	1	..	..	..	..	..	..
11. Generative Syst.:											
Varicocele ..	..	..	1	..	..	..	..	..	..	..	..
Orchitis ..	16	..	6	..	8	..	..	..	15	..	1
12. Organs of Loco- motion:											
Ostitis ..	1	..	..	..	1	..	1	..	1	..	..
Caries ..	..	..	2	1	..	..	..	..	..	..	..
Synovitis ..	1	..	6	..	1	..	..	..	..	..	..
Psoas Abscess ..	1	1	..	..	..	..	..	..	..	..	..
13. Of Cellular Tissue:											
Inflam: of Cel: Tissue	2	..	..	..	..	..	..	..	2	..	..
Abscess „ „	3	..	9	..	4	..	..	..	14	..	..
Guinea Worm ..	15	..	..	..	..	..	..	..	..	..	..
Effusion of Serum ..	..	..	1	..	..	..	..	..	..	..	..
14. Cutaneous Syst.:											
Intertrigo ..	1	..	..	..	..	..	..	..	..	..	..
Urticaria ..	..	..	1	..	..	..	..	..	..	..	..
Lichen ..	..	..	..	..	..	..	..	..	1	..	..
Psoriasis ..	1	..	..	..	..	..	..	..	..	..	..
Herpes ..	1	..	..	..	3	..	1	..	1	..	..
Eczema ..	3	..	..	..	..	..	..	..	1	..	..
Impetigo ..	..	..	..	..	1	..	..	..	..	..	..
Ulcer ..	37	..	24	..	9	..	4	..	22	..	1
Boil ..	18	..	3	..	6	..	..	..	5	..	..
Carbuncle ..	..	..	..	..	..	..	..	..	1	..	..
Whitlow ..	1	..	3	..	..	..	1	..	1	..	1
Elephantiasis ..	..	..	..	..	..	..	..	..	1	..	..
Warts ..	1	..	..	..	1	..	..	..	..	..	..
Ingrown Nail ..	..	..	1	..	..	..	..	..	..	..	..
Tinea ..	1	..	1	..	..	..	..	..	..	..	..
III. Conditions, &c.											
General Debility ..	..	..	2	..	..	..	..	..	1	..	..
IV. Poisons, &c.											
Delirium Tremens..	3	..	1	..	2	..	..	..	..	..	..
Alcohol ..	..	..	..	..	..	..	2	..	..	..	..

Abstract No. 14—continued.

Stations	Windward and Leeward Command.		Jamaica.		Honduras.		Bahamas.		Western Africa.		Black Troops in West Indies and W. Africa.
Average Strength	718		548		187		145		320		1,908
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Discharged as Invalids.
V. Injuries.											
2. Accidental :											
Burns and Scalds ..	..	..	1	..	..	..	..	..	1	..	..
Contusion	7	..	4	..	1	..	2	..	9	..	..
Fracture .. ..	..	..	1	..	..	..	1	..	..	..	..
Wounds	24	..	12	..	23	..	5	..	28	..	..
„ from Gunshot ..	..	..	..	..	..	..	1	..	..	..	..
Sprain	10	..	2	..	1	..	1	..	4	..	..
Dislocation .. ..	..	..	..	..	..	..	..	..	2	..	..
Blisters of the Feet ..	22	..	1	..	..	..	..	..	..	..	..
4. Self-inflicted :											
Hanging .. ..	..	1	..	..	..	..	..	..	..	..	..
Gunshot .. ..	..	1	..	..	..	..	..	..	..	..	..
VI. Surgical Operations											
Amputation of Thigh ..	..	..	..	..	..	..	..	..	..	..	1
„ Finger.. ..	..	..	..	..	..	..	..	..	..	..	..
No appreciable Disease ..	..	..	1	..	..	..	..	..	..	..	..
Total	668	18	448	17	172	2	147	6	625	5	12

APPENDIX No. XV—*continued.*

ABSTRACT No. 15, showing the Admissions into Hospital, and Deaths, among the Troops serving at the Cape of Good Hope and St. Helena, Mauritius, Ceylon, and Labuan, in the year 1871.

Stations.	Cape and St. Helena.		Mauritius.		Ceylon.				Labuan.	
					White.		Black.		Black.	
Strength	2,473		475		974		848		66	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. General Diseases.										
1. Febrile :										
Small Pox . . . . .	..	..	..	..	1	..	3	..	..	..
Cowpox.. . . . .	..	..	..	..	1	..	..	..	..	..
Chicken Pox	1	..	..	..	..	..	6	..	..	..
Measles	7	..	..	..	..	..	1	..	..	..
Enteric Fever	1	1	..	..	..	..	..	..	..	..
Simple continued Fever	37	1	2	..	33	..	2	..	..	..
Febricula	40	..	27	..	50	..	..	..	..	..
Ague	24	..	109	..	72	..	149	..	51	..
Remittent Fever	59	..	64	1	47	4	5	..	..	..
Cholera . . . . .	..	..	..	..	1	1	..	..	..	..
Influenza	88	..	8	..	5	..	..	..	..	..
Erysipelas	4	..	..	..	..	..	1	1	..	..
Mumps..	7	..	..	..	..	..	1	..	..	..
Malignant Pustule	1	..	..	..	..	..	..	..	..	..
2. Constitutional:										
Acute Rheumatism	16	..	3	..	8	..	6	..	1	..
Chronic "	57	..	6	..	9	..	5	..	..	..
Muscular "	6	..	10	..	12	..	3	..	..	..
Gonorrhœal Rheumatism	2	..	..	..	..	..	..	..	..	..
Gout	1	..	..	..	..	..	..	..	..	..
Primary Syphilis	281	..	17	..	69	..	6	..	..	..
Secondary "	71	..	8	..	30	..	3	..	..	..
Cancer	1	..	..	..	..	..	..	..	..	..
Scrofula	3	..	..	..	..	..	..	..	..	..
Phthisis Pulmonalis	7	2	3	..	6	..	2	..	..	..
Hæmoptysis (Tubercular)	2	1	..	..	..	..	..	..	..	..
Anæmia	2	..	4	..	16	..	..	..	..	..
General Dropsy	1	..	..	..	1	..	..	..	..	..
Diabetes . . . . .	..	..	..	..	..	..	1	..	..	..
Beri-beri . . . . .	..	..	..	..	..	..	15	..	70	11
II. Local Diseases.										
1. Diseases of the Nervous System:										
Encephalitis	1	..	..	..	..	..	..	..	..	..
Meningitis . . . . .	..	..	..	..	4	..	..	..	..	..
Apoplexy	1	2	..	..	..	..	..	..	..	..
Sunstroke	1	..	..	..	1	..	..	..	..	..

Abstract No. 15—continued.

Stations.. .. .	Cape and St. Helena.		Mauritius.		Ceylon.				Labuan.	
					White.		Black.		Black.	
Strength	2,473		475		974		848		66	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Paralysis	6	..	..	..	3	..	..	..	..	..
Locomotor Ataxy .. .. .	..	..	1	1	..	..	..	..	..	..
Tetanus	1	1	..	..	..	..	..	..	..	..
Epilepsy	4	..	2	..	2	..	..	..	..	..
Neuralgia	7	..	..	..	5	..	2	..	..	..
Mania	2	..	..	..	1	..	..	..	..	..
Dementia	1	..	..	..	..	..	3	..	..	..
Hypochondriasis	1	..	..	..	..	..	..	..	..	..
2. Diseases of the Eye :										
Conjunctivitis	58	..	2	..	18	..	34	..	1	..
Tarsal Ophthalmia	19	..	..	..	3	..	..	..	..	..
Iritis	1	..	..	..	1	..	..	..	..	..
Amaurosis	2	..	..	..	2	..	..	..	..	..
Ulcer of Cornea	1	..	..	..	..	..	2	..	1	..
Opacity .. .. .	..	..	..	..	..	..	1	..	..	..
Scleritis .. .. .	..	..	1	..	..	..	..	..	..	..
Hordolum .. .. .	..	..	..	..	1	..	..	..	..	..
Short Sight .. .. .	..	..	..	..	1	..	..	..	..	..
Hemeralopia .. .. .	..	..	..	..	1	..	..	..	..	..
3. Diseases of the Ear :										
Inflamm : Membr : Tympani.. ..	2	..	..	..	1	..	..	..	..	..
Inflamm : Ext : Meatus	3	..	1	..	9	..	..	..	..	..
Abscess	1	..	..	..	..	..	..	..	..	..
Otitis .. .. .	..	..	1	..	..	..	..	..	..	..
Deafness	1	..	..	..	..	..	..	..	..	..
4. Diseases of the Nose :										
Ozena	4	..	..	..	..	..	..	..	..	..
Abscess of Septum	1	..	..	..	..	..	..	..	..	..
Inflammation	1	..	..	..	..	..	..	..	..	..
5. Circulatory System :										
Valve Disease of Heart	9	2	..	..	6	..	..	..	..	..
Hypertrophy	2	1	..	..	..	..	..	..	..	..
Atrophy .. .. .	..	..	..	1	..	..	..	..	..	..
Palpitation	10	..	4	..	6	..	1	..	..	..
Aneurism of Aorta .. .. .	..	1	1	..	..	..	..	..	..	..
Aneurism .. .. .	..	..	..	..	2	..	..	..	..	..
Varicose Veins.. .. .	..	..	..	..	1	..	..	..	..	..
6. Absorbent System :										
Inflamm : of Glands	36	..	5	..	31	..	9	..	..	..
Suppuration of Glands	6	..	..	..	3	..	..	..	..	..
8. Respiratory System :										
Laryngitis	1	..	..	..	..	..	..	..	..	..
Bronchitis	42	1	8	..	23	..	26	1	..	..
Asthma .. .. .	..	..	..	..	..	..	2	..	..	..
Pneumonia	14	1	1	..	..	..	7	1	1	..
Pleurisy	1	..	..	..	1	..	2	..	1	..

Abstract No. 15—continued.

Stations.. .. .	Cape and St. Helena.		Mauritius.		Ceylon.				Labuan.	
					White.		Black.		Black.	
Strength	2,473		475		974		848		66	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
9. Digestive System :										
Ranula	1	..	..	..	..	..	..	..	..	..
Gum Boil	5	..	1	..	3	..	2	..	..	..
Salivary Fistula	1	..	..	..	..	..	1	..	..	..
Stomatitis .. .. .	..	..	..	..	..	..	..	..	..	..
Tonsillitis	70	..	6	..	7	..	1	..	..	..
Ulcerated Throat	1	..	..	..	2	..	..	..	..	..
Stricture of Oesophagus .. .. .	..	..	1	..	..	..	..	..	..	..
Dyspepsia	82	..	24	..	41	..	4	..	..	..
Enteritis	1	..	..	..	..	..	..	..	..	..
Dysentery	38	2	5	1	41	..	10	1	1	..
Diarrhœa	86	..	23	..	80	1	21	..	..	..
Hernia	1	..	..	..	1	..	1	..	..	..
Colic	10	..	1	..	7	..	2	..	1	..
Tænia Solium	5	..	1	..	2	..	..	..	..	..
Constipation	5	..	..	..	..	..	2	..	..	..
Fistula in Ano.. .. .	6	..	..	..	4	..	..	..	..	..
Hæmorrhoids	12	..	1	..	11	..	..	..	..	..
Abscess of Anus	1	..	..	..	..	..	..	..	..	..
Condyloma	4	..	..	..	..	..	..	..	..	..
Prolapsus Ani .. .. .	..	..	..	..	..	..	1	..	..	..
Hepatitis	24	..	13	1	44	1	2	1	..	..
Jaundice	9	..	..	..	8	..	..	..	..	..
Splenitis	1	..	5	..	..	..	..	..	..	..
Abscess of Liver	1	..	1	1	..	..	..	..	..	..
Enlargement of Liver.. .. .	5	..	..	..	..	..	..	..	..	..
10. Urinary System :										
Bright's Disease .. .. .	..	..	..	..	3	1	..	..	..	..
Nephritis	3	..	..	..	..	..	..	..	..	..
Gonorrhœa	451	..	23	..	72	..	15	..	..	..
Phimosis, &c.	3	..	..	..	..	..	..	..	..	..
Bubo	1	..	..	..	..	..	..	..	..	..
Epididymitis (Gon :)	12	..	..	..	2	..	2	..	..	..
Stricture of Urethra	6	..	4	..	4	..	1	..	..	..
Retention of Urine	3	..	..	..	..	..	..	..	..	..
Irritability of Bladder .. .. .	..	..	1	..	..	..	..	..	..	..
11. Generative System :										
Hydrocele	5	..	1	..	..	..	3	..	..	..
Orchitis	42	..	6	..	17	..	8	..	..	..
12. Organs of Locomotion :										
Ostitis	3	..	1	..	..	..	..	..	..	..
Caries	2	1	..	..	2	..	..	..	..	..
Necrosis	2	..	..	..	1	..	..	..	..	..
Synovitis	7	..	1	..	1	..	2	..	..	..
Inflammation of Joint	3	..	..	..	..	..	..	..	..	..
Bursal Tumour .. .. .	..	..	..	..	2	..	..	..	..	..
Contraction	4	..	..	..	1	..	..	..	..	..

Abstract No. 15—continued.

Station	Cape and St. Helena.		Mauritius.		Ceylon.		Labuan.	
					White.	Black.	Black.	
Strength	2,478		475		974	848	66	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
13. Diseases of Cellular Tissue:								
Inflammation of Cellular Tissue ..	2	..	1	..	2	..	2	..
Abscess	44	..	5	..	27	..	16	..
" .. .. .	..	..	..	..	..	..	2	..
14. Cutaneous System:								
Urticaria	3	..	..	..	..	..	..	..
Lichen	1	..	..	..	1	..	..	..
Psoriasis	2	..	..	..	..	..	..	..
Herpes	4	..	..	..	..	..	3	..
Eczema	12	..	..	..	6	..	4	..
Impetigo .. .. .	..	..	..	..	2	..	..	..
Erythema	1	..	..	..	..	..	..	..
Rupia	1	..	..	..	..	..	..	..
Acne	8	..	..	..	..	..	..	..
Ephidrosis	1	..	..	..	..	..	..	..
Tinea	1	..	..	..	..	..	1	..
Ulcer	138	..	16	..	66	..	46	..
Boil	20	..	7	..	17	..	10	..
Carbuncle	1	..	..	..	..	..	..	..
Whitlow	9	..	..	..	1	..	..	..
Itch	1	..	..	..	..	..	22	..
Warts	9	..	..	..	2	..	..	..
Corns	1	..	..	..	..	..	..	..
Ingrown Nail	1	..	..	..	..	..	..	..
Irritation by Pediculi	1	..	..	..	..	..	..	..
Irritation by Mosquito Bite .. .. .	..	..	..	..	1	..	..	..
Sebaceous Tumour	1	..	..	..	..	..	..	..
III. Conditions, &c.:								
General Debility	17	1	4	..	14	..	6	..
IV. Poisons.								
Delirium Tremens	13	1	2	1	1	..	..	..
Alcohol .. .. .	..	1	..	..	4	..	..	..
Cyanide of Potassium	1	..	..	..	..	..	..	..
V. Injuries.								
2. Accidental:								
Burns and Scalds	8	..	..	..	1	..	..	..
Multiple Injury	1	..	..	..	..	..	..	..
Asphyxia by Drowning .. .. .	..	..	..	..	..	1	..	..
Contusion	95	..	11	..	64	..	15	..
Concussion of the Brain .. .. .	..	1	..	..	..	..	..	..
Fracture	8	..	..	..	4	..	..	..
Wounds	88	..	14	..	44	..	22	..
" from Gunshot .. .. .	..	..	..	..	2	..	..	..
Sprain	71	..	7	..	25	..	9	..

Abstract No. 15—continued.

Stations	Cape and St. Helena.		Mauritius.		Ceylon.		Labuan.	
					White.	Black.	Black.	
Strength	2,473		475		974	848	66	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Dislocation	1	..	..	..	3	..	..	..
Blisters of the Feet	6	..	..	..	2	2	..	..
Foreign Body in Conjunctiva .. .. .	..	..	..	..	1	..	..	..
<i>VI. Surgical Operations.</i>								
Amputation of Forearm	1	..	1	..	..	..	..	..
No appreciable Disease	4	..	..	..	..	..	..	..
Totals	2,451	21	475	7	1133	9532	7133	11

CAUSES of the Deaths of the Invalids.

	Cape and St. Helena.	Mauritius.	Ceylon. White.	Labuan. Black.
Secondary Syphilis ..	1	..	..	..
Phthisis Pulmonalis ..	2	..	1	..
Beri-Beri .. .. .	..	..	..	9
Dementia	1	..	..	..
Dysentery and Diarrhœa..	..	..	2	..
Abscess of Liver	1	..	..	..
Total	5	..	3	9

APPENDIX No. XV—continued.

ABSTRACT No. 16, showing the Number of Men sent home from the Cape of Good Hope and St. Helena, Mauritius, and Ceylon, in 1871, as Invalids, and of Invalids finally discharged the Service in these Colonies and at Netley.

Diseases.	Invalids.								
	Sent Home from			Discharged at Netley from			Asiatic Troops.		
	Cape and St. Helena.	Mauritius.	Ceylon.	Cape and St. Helena.	Mauritius.	Ceylon.	Sent from La- buan to Ceylon.	Discharged in Ceylon from	
			White.					Troops in Ceylon.	Troops in Labuan.
I. General Diseases.									
Ague .. ..	..	..	..	..	..	..	6	..	..
Remittent Fever ..	..	..	1	..	..	..	..	..	..
Rheumatism .. ..	..	..	2	..	..	..	..	8	..
Secondary Syphilis..	2	..	1	..	1	2	..	1	..
Scrofula	1	..	..	2	..	..	..	..	..
Phthisis Pulmonalis	4	..	4	11	..	4	..	..	..
Anæmia .. ..	..	..	1	..	..	2	..	..	..
Beri-Beri .. ..	..	..	..	..	..	..	32	..	4
II. Local Diseases.									
1. Diseases of the Nervous Syst.:									
Meningitis .. ..	..	..	1	..	..	..	..	..	..
Sunstroke .. ..	..	..	1	..	..	..	..	..	..
Paralysis	1	..	2	1	..	..	..	..	..
Locomotor Ataxy ..	..	..	..	..	..	1	..	..	..
Epilepsy .. ..	..	..	1	1	..	..	..	..	..
Mania	1	..	1	..	..	..	..	..	..
Dementia	1	..	..	..	..	..	..	1	..
Hypochondriasis ..	1	..	..	..	..	..	..	..	..
2. Diseases of the Eye:									
Tarsal Ophthalmia..	5	..	1	..	..	..	..	2	..
Gonorrhœal „ ..	1	..	..	..	..	..	..	..	..
Cataract .. ..	..	..	..	1	..	..	..	..	..
Iritis .. ..	..	..	1	..	..	..	..	..	..
Amaurosis .. ..	..	..	1	..	..	..	..	..	..
Impaired Vision ..	..	..	..	..	..	..	..	4	..
Hemeralopia .. ..	..	..	..	..	..	1	..	..	..
Nyctalopia .. ..	..	..	..	..	..	..	..	1	..
3. Disease of the Ear:									
Deafness .. ..	..	..	1	..	..	..	..	..	..
4. Dis. of the Nose:									
Ozœna	1	..	..	..	..	..	..	..	..
5. Circulatory Syst:									
Valve Dis. of Heart	2	..	5	2	..	2	..	..	..
Hypertrophy „ ..	..	..	1	*3	..	2	..	..	..
Palpitation „ ..	1	..	1	1	..	..	..	..	..
Aneurism of Aorta ..	..	1	..	..	..	..	..	..	..
Aneurism .. ..	..	..	1	..	..	..	..	..	..

Abstract No. 16—continued.

Diseases.	Invalids.								
	Sent Home from			Discharged at Netley from			Asiatic Troops.		
	Cape and St. Helena.	Mauritius.	Ceylon.	Cape and St. Helena.	Mauritius.	Ceylon.	Sent from Labuan to Ceylon.	Discharged in Ceylon from	
								Troops in Ceylon.	Troops in Labuan.
6. Absorbent Syst.: Suppn : of Glands ..	1	..	..	..	..	..	..	..	..
8. Respiratory Syst.:									
Bronchitis .. ..	..	..	2	..	..	1	..	1	..
Asthma .. ..	..	..	..	..	..	..	..	1	..
9. Digestive Syst.:									
Dyspepsia	1	..	..	..	..	..	..	..	..
Dysentery	1	..	3	..	..	1	..	..	..
Diarrhoea .. ..	..	..	3	..	..	..	..	..	..
Hernia	1	..	1	1	..	2	..	..	..
Hæmorrhoids .. ..	..	..	2	..	..	..	..	..	..
Hepatitis	6	1	10	2	..	4	..	..	..
Cirrhosis .. ..	..	..	..	1	..	..	..	..	..
Ascites	1	..	..	..	..	..	..	..	..
10. Urinary Syst.:									
Bright's Disease ..	..	..	1	..	..	2	..	..	..
11. Generative Syst.:									
Orchitis .. ..	..	..	1	..	..	2	..	..	..
12. Organs of Locomotion:									
Caries	1	..	..	..	..	2	..	..	..
Necrosis	1	..	1	..	..	..	..	..	..
Acute Synovitis ..	1	..	..	..	..	..	..	..	..
Contraction	2	..	..	2	..	..	..	..	..
Exostosis .. ..	..	..	1	..	..	..	..	..	..
Talipes .. ..	..	..	..	..	..	1	..	..	..
14. Cutaneous Syst.:									
Ulcer .. ..	..	1	..	..	..	..	..	1	2
Tumour .. ..	..	..	..	..	..	..	..	1	..
III. Conditions, &c.									
General Debility ..	4	2	7	..	..	..	..	30	9
IV. Poisons.									
Lead Poison	1	..	..	..	..	..	..	..	..
V. Injuries.									
2. Accidental:									
Fracture .. ..	..	..	..	2	..	..	..	..	..
Wounds from Gun-shot .. ..	..	..	2	..	..	..	..	..	..
Dislocation .. ..	..	..	..	1	..	1	..	..	..
Loss of part of Finger	1	..	..	..	..	..	..	..	..
VI. Surgical Operations.									
Amputation of Arm	1	1	..	1	..	..	..	..	..
Total	44	6	61	*32	1	30	38	51	15

* Including 1 discharged at the Cape for Hypertrophy of the Heart.

APPENDIX No. XV—continued.

ABSTRACT No. 17, showing the Admissions into Hospital and Deaths among the Troops serving in China, Japan, and the Straits Settlements in 1871, and the Number of Men sent Home as Invalids, and of those finally Discharged the Service at Netley.

Stations	China.				Japan.		Straits Settlements.				China, Japan, and Straits. European Troops.	
	White.		Asiatic.				White.		Asiatic.			
Strength	516		936		395		571		627		1,482	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home as Invalids.	Discharged at Netley.
I. General Diseases.												
1. Febrile:												
Small Pox .. ..	..	..	25	..	14	2	6	..	..	..	..	..
Cowpox .. ..	..	..	..	..	2	..	..	..	..	..	..	..
Enteric Fever ..	..	..	..	..	60	6	..	..	..	1	..	..
Simple con: Fever	5	..	2	1	98	..	1	..	3	..	..	..
Febricula	60	..	..	..	55	..	130	..	15	..	..	..
Ague	19	..	355	..	8	..	188	..	380	..	4	3
Remittent Fever	140	..	19	..	1	..	1	..	4	1	12	..
Influenza	6	..	..	..	..	..	2	..	14	..	..	..
Erysipelas ..	2	..	..	..	2	..	1	..	..	..	..	..
Mumps .. ..	..	..	..	..	1	..	..	..	..	..	..	..
2. Constitutional:												
Acute Rheumatism..	4	..	3	..	10	..	4	..	2	..	1	..
Gonorrheal „ ..	..	..	..	..	..	..	2	..	..	..	..	..
Chronic „ ..	1	..	33	..	..	..	8	..	72	..	1	2
Muscular „ ..	5	..	3	..	10	..	13	..	3	..	..	..
Gout .. ..	..	..	..	..	..	..	1	..	..	..	..	..
Primary Syphilis ..	17	..	1	..	37	..	47	..	7	..	..	..
Secondary „ ..	30	..	4	..	23	..	21	2	8	..	9	3
Scrofula .. ..	..	..	..	..	..	..	1	..	..	..	..	1
Phthisis Pulmonalis	2	..	4	1	1	..	3	1	2	1	5	16
Hæmoptysis (Tub.)..	..	..	..	..	1	..	2	..	..	..	2	..
Purpura .. ..	..	..	..	..	1	..	..	..	..	..	1	..
Scurvy .. ..	..	..	..	..	12	..	..	..	..	..	..	..
Anæmia .. ..	..	..	2	..	1	..	..	..	2	..	..	1
General Dropsy ..	..	..	2	..	..	..	..	..	3	..	..	..
II. Local Diseases.												
1. Diseases of the Nervous System:												
Encephalitis	1	..	..	..	..	..	1	..	..	..	..	..
Meningitis .. ..	..	..	..	..	..	..	1	..	..	..	1	..
Apoplexy .. ..	..	1	..	1	..	..	..	..	..	..	..	..
Sunstroke .. ..	..	..	..	..	2	1	..	1	..	..	..	..
Paralysis .. ..	..	..	2	..	..	..	..	..	..	..	..	1
Locomotor Ataxy ..	..	..	..	..	..	..	..	..	..	..	..	1
Epilepsy	2	..	..	..	..	..	..	..	..	..	2	..
Neuralgia	6	..	2	..	1	..	1	..	5	..	1	..
Mania .. ..	..	..	..	..	..	..	..	..	5	..	..	..
Dementia .. ..	..	..	5	..	1	..	2	..	..	..	..	..

Abstract No. 17—continued.

Stations	China.				Japan.		Straits Settlements.				China, Japan, and Straits. European Troops.	
	White.		Asiatic.				White.		Asiatic.			
Strength	516		936		895		571		627		1,482	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home as Invalids.	Discharged at Netley.
2. Diseases of the Eye:												
Conjunctivitis ..	5	..	2	..	28	..	8	..	48	..	1	..
Tarsal Ophthalmia..	2	..	..	..	..	..	..	..	3	..	..	9
Ulcer of Cornea ..	..	..	..	..	..	..	..	..	1	..	..	..
Iritis ..	..	..	..	..	1	..	..	..	..	..	..	..
Amanosis ..	1	..	..	..	..	..	..	..	2	..	..	..
Impaired Vision ..	..	..	1	..	..	..	..	..	..	..	..	1
3. Diseases of the Ear:												
Inflam: Membr: Tymp:	..	..	..	..	1	..	..	..	11	..	..	..
Deafness ..	..	..	..	..	..	..	..	..	..	..	..	2
Inflam: of Ear ..	4	..	2	..	..	..	18	..	..	..	..	..
4. Diseases of the Nose:												
Epistaxis ..	1	..	..	..	..	..	..	..	..	..	..	..
5. Circulatory Syst:												
Adht: Pericardium ..	..	..	..	..	1	..	..	..	..	..	1	..
Valve Dis: of Heart ..	..	..	1	..	..	..	1	..	..	..	1	2
Hypertrophy ..	..	..	..	..	..	..	..	..	..	..	2	3
Angina Pectoris ..	1	..	..	..	..	..	..	..	..	..	..	..
Palpitation ..	2	..	1	..	..	..	11	..	1	..	5	3
Varicose Veins ..	..	..	..	..	..	..	..	..	1	..	..	..
6. Absorbent Syst:												
Inflam. of Glands ..	2	..	..	..	3	..	10	..	..	..	..	..
Suppuration ..	1	..	..	..	..	..	2	..	..	..	..	..
8. Respiratory Syst:												
Laryngitis ..	..	..	..	..	..	..	1	..	..	..	..	..
Bronchitis ..	7	..	28	..	37	..	25	..	10	..	2	1
Asthma ..	..	..	13	..	..	..	..	..	5	1	..	..
Emphysema ..	1	..	..	..	..	..	..	..	..	..	..	..
Pneumonia..	2	1	8	1	2	..	1	..	2	..	..	..
Pleurisy ..	1	..	3	..	1	..	1	..	..	..	1	2
9. Digestive Syst:												
Stomatitis ..	..	..	1	..	2	..	..	..	5	..	..	..
Infl: of Saliv Glands ..	..	..	1	..	..	..	..	..	..	..	..	..
Caries of Alveoli ..	..	..	..	..	1	..	..	..	..	..	..	..
Gum Boil ..	..	..	..	..	2	..	..	..	4	..	..	..
Sloughing of Pharynx ..	..	..	..	..	1	..	1	..	..	..	..	..
Tonsillitis ..	4	..	1	..	8	..	19	..	2	..	..	..
Gastritis ..	..	..	..	..	..	..	1	..	..	..	..	..
Hæmatemesis ..	1	..	..	..	..	..	..	..	..	..	..	..
Dyspepsia ..	52	..	25	..	2	..	67	..	58	..	..	1
Typhilitis ..	..	..	..	..	1	..	..	..	..	..	..	..
Dysentery ..	6	..	59	..	1	..	13	1	47	..	3	4
Diarrhoea ..	64	..	198	3	5	..	41	..	91	6	1	1
Hernia ..	1	..	..	..	1	..	..	..	1	..	..	..
Colic ..	1	..	2	..	..	..	4	..	25	..	..	..

Abstract No. 17—continued.

Stations	China.				Japan.		Straits Settlements.				China, Japan, and Straits European Troops.	
	White.		Asiatic.				White.		Asiatic.			
Strength	516		936		395		571		627		1,482	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home as Invalids.	Discharged at Netley.
Tænia Solium ..	..	..	..	..	..	..	1	..	..	..	..	..
Melæna ..	..	..	..	..	..	..	..	..	1	..	..	..
Constipation ..	1	..	..	..	..	..	..	..	1	..	..	..
Fistula in Ano ..	..	..	..	..	..	..	..	..	1	..	..	..
Hæmorrhoids ..	5	..	3	..	4	..	4	..	1	..	1	..
Abscess of Anus ..	..	..	..	..	..	..	2	..	..	..	..	..
Hepatitis ..	8	..	..	..	6	..	21	..	1	..	5	3
Congestion of Liver	8	..	..	..	..	..	1	..	..	..	..	..
Cirrhoæis ..	..	..	..	..	1	..	..	..	..	..	1	1
Jaundice ..	2	..	1	..	4	..	5	..	..	..	5	..
Splenitis ..	1	..	..	..	2	..	3	..	2	..	4	..
Peritonitis ..	..	..	..	..	..	..	..	..	1	1	..	..
Ascites ..	..	..	..	..	..	..	..	..	..	..	1	..
10. Urinary Syst:												
Cystitis ..	..	..	1	..	..	..	..	..	..	..	..	..
Bright's Disease ..	..	..	..	..	1	..	..	..	..	..	..	..
Nephritis ..	1	..	..	..	..	..	..	..	..	..	..	..
Gonorrhœa ..	45	..	12	..	103	..	45	..	1	..	..	..
Phimosia, &c. ..	..	..	2	..	..	..	..	..	..	..	..	..
Bubo ..	4	..	..	..	3	..	..	..	4	..	..	..
Epididymitis Gon...	1	..	..	..	9	..	2	..	1	..	..	..
Stricture of Urethra	3	..	1	..	1	..	2	..	2	..	..	1
Incontin: of Urine	2	..	..	..	..	..	..	..	..	..	..	..
11. Generative Syst:												
Varicocele ..	1	..	..	..	..	..	..	..	..	..	..	..
Hydrocele ..	2	..	4	..	..	..	..	..	..	..	..	..
Orchitis ..	7	..	7	..	..	..	7	..	4	..	1	..
Cyst of Testicle ..	..	..	..	..	..	..	..	..	..	..	1	..
Edema of Scrotum ..	..	..	..	..	2	..	..	..	..	..	..	..
Spermatorrhœa ..	..	..	..	..	..	..	1	..	..	..	1	..
12. Organs of Loco:												
Ostitis ..	..	..	1	..	..	..	1	..	..	..	..	..
Synovitis ..	..	..	7	..	1	..	2	..	1	..	..	1
Cont: of Tendons ..	1	..	..	..	..	..	..	..	..	..	..	..
Ganglion ..	..	..	..	..	..	..	..	..	2	..	..	..
13. Diseases of Cel- lular Tissue:												
Inflam: of Cell: Tissue	11	..	12	..	1	..	5	..	5	..	..	..
Abscess " "	2	..	13	..	2	..	8	..	5	..	..	..
Guinea Worm ..	..	..	5	..	..	..	..	..	5	..	..	..
14. Cutaneous Syst.												
Lichen ..	..	..	..	..	..	..	..	..	1	..	..	..
Psoriasis ..	1	..	..	..	2	..	8	..	4	..	..	..
Herpes ..	1	..	3	..	..	..	..	..	7	..	..	..
Eczema ..	5	..	1	..	1	..	3	..	..	..	1	1
Impetigo ..	..	..	..	..	..	..	1	..	..	..	..	..
Prurigo ..	1	..	..	..	..	..	..	..	..	..	..	..

Abstract No. 17—continued.

Stations	China.				Japan.		Straits Settlements.				China, Japan, and Straits. European Troops.	
	White.		Asiatic.				White.		Asiatic.			
Strength	516		936		395		571		627		1,482	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Sent Home as Invalids.	Discharged at Netley.
Ringworm	1	..	8	..	1	..	..	..	..	..	..	..
Mentagra	1	..	..	..	..	..	..	..	..	..	..	..
Aene .. ..	..	..	2	..	..	..	..	..	..	..	..	..
Ichthyosis .. ..	..	..	1	..	..	..	..	..	..	..	..	..
Pemphigus .. ..	..	..	..	..	2	..	9	..	..	..	..	..
Erythema .. ..	..	..	..	..	..	..	3	..	..	..	..	..
Ulcer	20	..	48	..	12	..	20	..	59	..	2	2
Boil	24	..	16	..	10	..	18	..	50	..	..	..
Carbuncle .. ..	..	..	1	..	..	..	..	..	..	..	..	..
Whitlow	1	..	9	..	3	..	6	..	1	..	..	..
Itch	1	..	151	..	10	..	..	..	42	..	..	..
Warts	1	..	..	..	..	..	1	..	..	..	..	..
Corn .. ..	..	..	..	..	..	..	..	..	1	..	..	..
Tumour .. ..	..	..	..	..	3	..	1	..	..	..	..	..
Stings of Insects ..	..	..	..	..	..	..	..	..	2	..	..	..
III. Conditions, &c.												
General Debility ..	7	..	11	..	9	..	3	..	17	..	3	5
IV. Poisons.												
Delirium Tremens ..	5	1	..	..	7	..	8	..	..	..	..	..
Alcohol .. ..	..	..	..	..	2	1	..	..	..	..	..	..
Cyanide of Potassium	..	..	..	..	..	..	..	1	..	..	..	..
V. Injuries.												
2. Accidental:												
Burns and Scalds ..	..	..	3	..	3	..	1	..	4	..	..	..
Asphyxia by Drown- ing .. ..	..	..	..	..	..	1	..	..	..	..	..	..
Contusion	81	..	12	..	20	..	25	..	13	..	..	..
Fracture	2	..	1	..	2	..	2	..	..	..	..	..
Wounds	7	..	19	..	15	..	16	..	24	..	..	..
Sprain	8	..	9	..	6	..	12	..	11	..	..	..
Dislocation	1	..	1	..	1	1	..	..	..	..	..	1
Blisters of the Feet	1	..	4	..	2	..	5	..	4	..	..	..
4. Self-inflicted:												
Gunshot .. ..	..	..	..	..	..	..	..	1	..	..	..	..
Cut Throat .. ..	..	..	..	..	..	1	..	..	..	..	..	..
VI. Surgical Opera- tions:												
Amputn: of Finger	..	..	1	..	..	..	..	..	..	..	..	..
Removal of Tumour	..	..	1	..	..	..	..	..	..	..	..	..
Amputn: of Thigh	..	..	..	..	..	..	..	..	..	..	..	1
No appreciable disease	4	..	..	..	3	..	1	..	..	..	..	..
Total	681	3	1,174	7	698	13	907	8	1,120	11	82	78

APPENDIX No. XV—continued.

ABSTRACT No. 18, showing the admissions into Hospital and Deaths among Her Majesty's European Troops serving in Bengal, Madras, and Bombay, during the Year 1871, and the disabilities of the Invalids sent to England and discharged at Netley.

Average Strength ..	Bengal.		Madras.		Bombay.		Invalids sent Home from			India.
	85,452		10,684		10,888					56,974
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	Discharged at Netley.
I. General Diseases.										
1. Febrile :										
Small Pox ..	11	1	3	..	..	..	..	..	..	..
Cowpox ..	1	..	..	..	..	..	..	..	..	..
Chicken Pox ..	2	..	..	..	..	..	..	..	..	..
Measles ..	17	1	4	..	..	..	..	..	..	..
Scarlet Fever ..	7	..	5	..	..	..	..	..	..	..
Dengue ..	..	..	..	..	222	..	..	..	..	..
Cerebro-Spinal Fever	1	1	..	..	..	..	..	..	..	..
Enteric Fever ..	181	48	45	15	28	18	1	..	2	..
Simple Cont: Fever.	3,153	19	375	4	1,426	4	1	..	..	..
Febricula ..	1,398	..	311	..	230	..	..	..	..	..
Ague ..	14,788	1	947	..	5,608	2	99	..	26	56
Remittent Fever ..	1,306	69	143	7	195	9	13	1	..	..
Cholera ..	42	25	76	36	1	..	..	..	..	..
Diphtheria ..	1	..	..	..	1	1	..	..	..	..
Hooping Cough ..	1	..	..	..	..	..	..	..	..	..
Mumps ..	7	..	14	..	3	..	..	..	..	..
Influenza ..	46	..	17	..	6	..	..	..	..	..
Erysipelas ..	97	3	20	1	5	..	..	..	1	1
Pyæmia ..	1	1	..	..	1	1	..	..	..	..
2. Constitutional :										
Acute Rheumatism	676	1	121	1	191	..	3	..	..	..
Chronic ..	807	..	205	..	146	..	96	11	9	32
Gonorrhœal ..	19	..	6	..	3	..	..	..	..	..
Synovial ..	8	..	..	..	..	..	..	..	..	..
Muscular ..	450	..	120	..	140	..	5	..	..	1
Gout ..	4	..	..	..	1	..	1	..	..	..
Chr: Osteo-Arthritis	6	..	..	..	..	..	..	..	..	..
Primary Syphilis ..	2,627	..	605	..	660	..	1	1	..	1
Secondary ..	890	2	396	1	270	..	98	26	16	50
Cancer ..	9	6	1	..	1	1	1	..	..	2
Lupus ..	7	..	3	..	..	..	..	..	..	..
Scrofula ..	18	..	11	..	6	..	6	..	1	12
Morbus Coxarius ..	3	..	..	..	..	..	1	..	..	3
Phthisis Pulmonalis	305	58	137	12	91	15	117	32	19	186
Hæmoptysis (Tub:)	17	..	4	..	9	..	1	..	..	..
Purpura ..	7	..	..	..	3	..	1	..	..	..
Scurvy ..	7	..	3	..	2	..	1	..	..	..
Anæmia ..	236	..	66	..	77	1	134	8	12	30
General Dropsy ..	11	..	2	..	15	..	1	..	..	..
Simple Cyst ..	1	..	..	..	..	..	..	..	..	..
Diabetes ..	2	..	..	..	..	..	1	..	..	1

Abstract No. 18—continued.

Average Strength ..	Bengal.		Madras.		Bombay.		Invalids sent Home from			India.
	35,452		10,684		10,838					56,974
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	Discharged at Netley.
II. Local Diseases :										
1. Nervous System										
Encephalitis ..	9	3	..	..	2	1	2	1	..	..
Meningitis ..	16	7	6	..	6	2	2	..	1	..
Softening of Brain ..	2	1	5	2	1	..	..	..	..	..
Abscess ..	2	2	..	..	..	..	..	..	..	..
Atrophy ..	..	..	1	..	..	..	..	..	..	..
Apoplexy ..	14	13	4	7	5	6	1	1	1	..
Sunstroke ..	49	19	19	3	32	10	5	..	..	..
Paralysis ..	51	1	13	..	8	1	15	..	..	10
Locomotor Ataxy ..	..	..	2	..	1	1	..	2	..	9
Tetanus ..	1	1	1	1	..	..	..	..	..	..
Hydrophobia ..	4	4	1	1	..	..	..	..	..	..
Convulsions ..	4	..	..	..	1	..	..	..	..	..
Spasm of Muscle ..	2	..	1	..	..	..	..	..	..	..
Chorea ..	1	..	..	..	..	..	..	..	..	..
Hysteria ..	1	..	..	..	..	..	..	..	..	..
Epilepsy ..	93	..	33	..	12	1	25	2	4	7
Neuralgia ..	253	..	104	..	35	..	4	1	3	4
Anæsthesia ..	..	..	2	..	..	..	..	..	..	..
Mania ..	23	..	8	..	6	..	12	5	2	..
Dementia ..	81	1	26	1	16	..	25	18	6	..
Hypochondriasis ..	7	..	6	..	1	..	..	..	..	..
Stammering ..	..	..	..	..	..	..	..	..	..	1
2. Diseases of the Eye :										
Loss of Sight ..	..	..	..	..	..	..	1	..	..	..
Conjunctivitis ..	658	..	150	..	192	..	3	..	1	..
Pustular Ophthalmia ..	1	..	..	..	..	..	..	..	..	..
Tarsal Ophthalmia ..	108	..	12	..	59	..	..	1	1	5
Catarrhal ..	9	..	2	..	2	..	..	..	..	..
Purulent ..	..	..	1	..	5	..	..	..	..	..
Gonorrhœal ..	3	..	..	..	2	..	..	..	..	..
Strabismus ..	..	..	1	..	..	..	..	..	..	..
Keratitis ..	7	..	7	..	5	..	1	..	1	..
Ulcer of Cornea ..	7	..	4	..	4	..	..	..	..	..
Opacity ..	..	..	3	..	1	..	2	..	..	3
Chronic Ophthalmia ..	13	..	..	..	3	..	1	..	..	..
Iritis ..	16	..	4	..	7	..	2	..	..	1
Scleritis ..	7	..	..	..	1	..	..	..	1	..
Retinitis ..	..	..	2	..	..	..	..	..	..	..
Impaired Vision ..	5	..	..	..	8	..	7	..	..	12
Amaurosis ..	8	..	4	..	2	..	1	1	2	..
Glaucoma ..	..	..	1	..	..	..	..	..	..	..
Hemeralopia ..	1	..	1	..	3	..	1	..	..	1
Short Sight ..	5	..	..	..	..	..	3	..	..	1
Nyctalopia ..	1	..	1	..	..	..	..	..	..	..
Choroiditis ..	3	..	..	..	..	..	..	..	..	..
Lachrymal Abscess ..	..	..	2	..	..	..	..	..	..	..
Musæ Volitantes ..	1	..	..	..	..	..	..	..	..	..
Hordeolum ..	..	..	4	..	1	..	..	..	..	..
Pterygium ..	1	..	..	..	1	..	..	..	..	..

Abstract No. 18—continued.

	Bengal.		Madras.		Bombay.		Invalids sent Home from			India.
Average Strength ..	35,452		10,684		10,838					56,974
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	Discharged at Netley.
Trichiasis ..	1	..	2	..	..	..	..	..	..	..
Abscess of Lachry- mal Apparatus ..	1	..	..	..	..	..	..	..	..	..
Madarosis ..	..	..	1	..	..	..	..	..	..	..
Protrusion of Eyeball	2	..	..	..	..	..	..	..	..	..
3. Diseases of Ear:										
Perforation of Ear ..	2	..	..	..	..	..	2	..	..	..
Accumulation of Wax	2	..	..	..	..	..	..	..	..	..
Infl. Membr. Tympani	108	..	39	..	26	..	1	..	..	1
Infl. external Meatus	108	..	38	..	18	..	..	..	..	..
Deafness ..	32	..	19	..	6	..	12	2	1	16
Tumour ..	..	..	2	..	..	..	..	..	..	..
Abscess ext. Meatus	27	..	11	..	3	..	..	..	..	..
Polypus ..	4	..	3	..	..	..	..	..	..	..
Organic Disease ..	..	..	1	..	..	..	..	..	..	..
Necrosis ..	..	..	1	..	..	..	..	..	..	..
Dis. of Mastoid Cells	..	..	..	..	1	1	..	..	..	..
4. Diseases of Nose:										
Epistaxis ..	13	1	1	..	4	..	..	..	..	..
Ozena ..	2	..	2	..	..	..	..	1	..	..
Ulceration ..	..	1	..	..	..	..	..	..	..	..
Abscess of Septum ..	..	..	2	..	..	..	..	..	..	..
Polypus ..	..	..	1	..	..	..	..	..	..	..
Inflam. of Pituitary Membrane ..	1	..	..	..	..	..	..	..	..	..
5. Circulatory Syst.										
Pericarditis ..	20	1	4	1	9	..	1	..	1	..
Adhrnt. Pericardium	..	..	..	..	1	1	1	..	..	..
Fatty Degn. of Heart	1	3	1	1	..	1	..	..	..	..
Rupture ..	1	1	..	..	..	..	..	..	..	..
Valve Disease ..	126	21	53	6	33	7	52	5	11	55
Hypertrophy ..	76	7	26	2	11	..	46	2	4	59
Dilatation ..	2	..	5	..	1	..	..	..	1	..
Atrophy ..	..	..	..	..	..	..	..	1	..	..
Angina Pectoris ..	4	..	5	..	..	..	..	..	..	1
Syncope ..	1	..	..	..	..	..	..	..	..	..
Palpitation ..	340	..	85	..	84	..	44	5	6	24
Aneurism of Aorta ..	35	23	17	11	5	4	4	..	..	4
Rupture ..	..	1	..	1	..	..	..	..	..	..
Degeneration ..	1	..	..	..	..	..	..	..	..	..
Aneurism ..	3	1	..	1	1	1	3	..	..	4
Phlebitis ..	1	..	..	..	1	..	1	..	..	..
Varicose Veins ..	13	..	10	..	11	..	12	1	1	5
Endocarditis ..	..	1	..	..	..	..	..	..	..	..
Dilatation of Artery	..	..	..	..	..	..	..	..	..	1
Hæmorrhage ..	..	1	..	..	..	..	..	..	..	..
Venous Obstruction	..	..	..	..	..	..	..	..	..	1
6. Absorbent Syst.										
Inflam. of Glands ..	588	..	246	..	207	..	1	..	..	..
Suppuration ..	62	..	34	..	45	..	..	..	..	..
Lymphatic Fistula ..	..	..	..	..	..	..	..	..	..	..
Hypertrophy of In- guinal Glands ..	2	..	..	..	..	..	..	..	..	..

Abstract No. 18—continued.

Average Strength ..	Bengal.		Madras.		Bombay.		Invalids sent Home from			India.
	85,452		10,684		10,838					56,974
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	Discharged at Netley.
7. Diseases of Ductless Glands.										
Goitre	1	..	..	..	..	..	..	..	..	1
Addison's Disease ..	1	..	..	..	..	..	..	..	..	..
8. Respiratory Syst:										
Coryza	26	..	1	..	14	..	..	..	..	..
Aphonia	2	..	..	..	..	..	1	..	..	..
Laryngitis	4	..	..	..	..	..	2	..	..	..
Bronchitis	1,776	4	396	3	397	1	29	14	8	19
Asthma	10	..	14	..	14	..	1	1	5	5
Emphysema	7	1	3	..	..	..	4	..	..	4
Pneumonia	201	36	29	2	34	3	2	..	1	8
Pulmonary extrava : ..	5	4	1	1	..	..	..	..	..	..
Pleurisy	144	8	18	..	14	..	5	..	..	2
Empyema	1	1	..	..	..	..	..	..	..	..
Inf: Bronchial Glands	1	..	..	..	..	..	..	..	..	..
9. Digestive Syst :										
Tonsillitis	653	..	191	..	189	..	..	..	..	..
Gastritis	8	..	1	..	3	..	..	..	1	..
Dyspepsia	1,248	..	827	..	866	..	14	1	..	2
Enteritis	3	..	3	..	2	..	..	..	..	..
Dysentery	1,168	23	793	22	249	9	58	31	3	42
Diarrhoea	2,269	8	657	..	626	4	16	3	1	6
Hernia	45	..	18	..	12	..	12	1	5	14
Colic	193	..	68	..	59	..	..	..	..	..
Tænia	149	..	41	..	72	..	..	..	..	1
Ascaris Lumbricoides	..	..	3	..	..	..	..	..	..	..
Constipation	42	..	19	..	16	..	..	..	..	..
Fistula in Ano	44	..	14	..	6	..	2	..	1	1
Hæmorrhoids	294	..	97	..	72	..	3	..	..	1
Hepatitis	1,919	5	713	41	464	18	241	53	30	73
Cirrhosis	10	5	..	1	1	..	..	..	1	..
Jaundice	223	1	28	..	39	1	..	..	..	2
Splenitis	262	2	27	..	62	..	23	1	4	20
Congestion of Spleen	14	1	..	..	..	..	8	..	..	10
Peritonitis	11	3	2	2	2	..	..	..	..	..
Ascites	1	..	..	..	7	1	..	..	3	..
Ulcer of Lip .. ..	..	..	1	..	2	..	..	..	..	..
„ Tongue .. ..	..	..	2	..	1	..	..	..	..	..
Spasm of Glottis .. ..	..	1	..	..	..	..	..	..	..	..
Abscess of Cheek	4	..	5	..	1	..	..	..	..	..
Caries of Dental Tissue and Alveoli	4	..	8	..	1	..	..	1	..	..
Gum Boil	68	..	46	..	10	..	..	..	..	..
Sore Throat	37	..	3	..	9	..	..	..	..	..
Hypert: of Spleen .. ..	..	..	..	..	..	..	1	..	..	..
Quinsy	2	..	1	..	2	..	..	..	..	..
Abscess .. ..	..	..	2	..	5	..	..	2	..	..
Fæcal Abscess	1	..	..	..	..	..	..	..	..	..
Hæmatemesis	4	..	1	..	2	1	..	..	..	..
Perforation of Ilium ..	..	1	..	..	..	..	..	..	..	..

2 D 2

Abstract No. 18—*continued.*

Average Strength ..	Bengal.		Madras.		Bombay.		Invalids sent Home from			India.
	35,452		10,684		10,838					56,974
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	Discharged at N. Col.
Intussusception ..	..	..	1	..	..	..	..	..	..	..
Ulcer of Rectum ..	7	..	6	..	..	..	..	..	..	..
" Stomach ..	3	1	..	..	2	..	..	..	..	..
Fissure of Anus ..	7	..	2	..	..	..	..	..	..	..
Abscess of Anus ..	5	..	..	..	..	..	..	..	..	..
Prolapsus of Rectum ..	2	..	1	..	3	..	..	..	..	1
Stricture ..	..	..	..	..	..	..	1	..	..	1
Condyloma ..	..	..	4	..	..	..	..	..	..	..
Oxyuria Vermicularis ..	..	..	1	..	..	..	..	..	..	..
Cyst of Liver ..	2	..	..	..	..	..	..	..	..	..
Abscess ..	136	101	25	..	5	..	5	..	..	..
Enlargement of Liver ..	30	..	..	..	..	..	3	..	..	..
Stomatitis ..	15	..	..	..	1	..	..	..	..	..
Typhlitis ..	8	..	..	..	1	..	..	..	..	..
Perfor. of Intestines ..	4	2	..	..	1	1	..	..	..	..
Melæna ..	1	..	..	..	1	..	..	..	..	..
Hæmorrhage (Intes.) ..	3	..	..	..	..	..	..	..	..	..
Ulceration of Intes. ..	..	..	..	..	..	1	..	..	..	..
Thrush ..	1	..	..	..	..	..	..	..	..	..
Ranula ..	2	..	..	..	..	..	..	..	..	..
Caries of Teeth ..	1	..	..	..	..	..	..	..	..	..
Necrosis of Jaw ..	1	..	..	..	..	..	..	..	..	..
Abscess ..	3	..	..	..	..	..	..	..	..	..
Glossitis ..	1	..	..	..	..	..	..	..	..	..
Abscess of Tongue ..	1	..	..	..	..	..	..	..	..	..
Infla. of Saliv. Glands ..	10	..	..	..	..	..	..	..	..	..
Glandular Tumour ..	2	..	..	..	..	..	..	..	..	..
Tumour of Stomach ..	1	1	..	..	..	..	..	..	..	..
Larvæ of Gadfly ..	1	..	..	..	..	..	..	..	..	..
Prolapsus of Anus ..	6	..	..	..	..	..	1	..	..	..
Condyloma of Anus ..	7	..	..	..	..	..	..	..	..	..
10. Urinary Syst:										
Bright's Disease ..	37	8	5	..	8	2	10	1	2	9
Nephritis ..	22	..	3	..	8	2	..	..	..	..
Hæmaturia Renalis ..	2	..	..	..	1	..	..	..	..	..
Diuresis ..	1	..	..	..	..	..	..	..	..	..
Incontinence of Urine ..	13	..	5	..	1	..	..	..	..	..
Retention of ..	2	..	1	..	..	..	..	..	..	..
Gonorrhœa ..	3,411	..	829	..	843	..	..	..	..	..
Phimosis, &c. ..	25	..	7	..	15	..	..	..	..	..
Bubo ..	3	..	32	..	2	..	..	..	..	..
Epididymitis (Gon.) ..	120	..	16	..	25	..	..	..	..	..
Stricture of Urethra ..	132	..	27	..	36	..	11	..	..	1
Urinary Abscess ..	2	..	..	..	..	..	..	..	..	..
Extravasation of Urine ..	1	..	..	..	..	..	..	..	..	..
Urinary Fistula ..	7	..	9	..	2	..	1	..	..	..
Cystitis ..	22	..	2	..	9	..	..	1	..	..
Irritability of Bladder ..	1	..	..	..	..	..	..	..	..	..
Calculus ..	4	..	1	..	..	..	..	..	1	..
Ulcer of Urethra ..	..	..	..	..	..	..	..	..	..	..
Infl. of Prostatic Gland ..	1	..	..	..	1	..	..	..	..	..

Abstract No. 18—continued.

Average Strength ..	Bengal.		Madras.		Bombay.		Invalids sent Home from			India. 56,974
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	
11. Generative Sys :										
Variococele ..	22	..	2	..	..	..	1	..	..	1
Hydrocele ..	18	..	11	..	3	..	2	..	..	3
Hæmatocele ..	..	..	2	..	..	..	..	..	..	..
Orchitis ..	503	..	170	..	87	..	1	1	..	2
Abcess of Testis ..	..	..	4	..	3	..	..	..	..	..
Atrophy of Testicle ..	1	..	..	..	..	..	..	..	1	1
Protrusion of Tubuli ..	4	..	..	..	..	..	..	..	..	..
Hypert : Male Mam: ..	3	..	..	..	..	..	..	..	..	..
Cyst of ..	1	..	..	..	..	..	..	..	..	..
Spermatorrhœa ..	1	..	3	..	..	..	..	..	..	..
Abcess of Penis ..	2	..	..	..	..	..	..	..	..	..
Warts ..	36	..	..	..	..	..	..	..	..	..
Neuralgia of Testes ..	..	..	..	..	..	..	1	..	..	..
12. Organs of Loco :										
Ostitis ..	58	..	19	..	19	..	..	..	2	..
Caries ..	6	1	3	1	..	..	2	..	..	2
Necrosis ..	9	..	2	..	..	..	..	1	..	1
Synovitis ..	84	..	27	..	23	..	5	..	4	3
Dropsy of Joint ..	1	..	4	..	1	..	1	..	..	..
Enlrgd: Bursa Patellæ ..	8	..	1	..	..	..	..	..	..	..
Bursal Abscess ..	2	..	..	..	..	..	..	..	..	..
Hypertrophy of Bone ..	..	..	..	..	..	..	..	..	..	1
Oseous Tumour ..	1	..	3	..	2	..	1	..	..	..
Relaxation of Ligam: ..	1	..	..	..	..	..	..	..	..	3
Deformity of Spine ..	2	..	1	..	..	..	..	1	..	..
Muscular Atrophy ..	..	..	1	..	..	..	1	..	..	1
Tumour ..	..	..	2	..	..	..	..	..	..	..
Gangrene of Toes ..	..	..	..	..	..	..	1	..	..	1
Bursal Tumour ..	2	..	..	..	..	..	..	..	..	..
Contraction ..	7	..	1	..	..	..	8	..	1	5
Psoas Abscess ..	..	..	..	..	..	..	1	..	..	..
Ganglion ..	..	..	1	..	..	..	..	..	..	..
Bunion ..	3	..	..	..	..	..	..	..	..	..
Cystic Tumour ..	..	..	..	..	3	..	..	..	..	..
Ulceratn: of Cartilage ..	..	..	..	..	..	..	1	..	..	1
Inflam: of Tendon ..	..	..	..	..	1	..	..	..	..	..
Rupture ..	..	..	..	..	1	..	..	..	..	..
Abcess of Muscle ..	3	..	..	..	..	..	..	..	..	..
Enlargement of Knee ..	..	..	..	..	..	..	1	..	..	..
13. Diseases of Cellular Tissue.										
Inflam: of Cell: Tissue ..	66	..	47	..	30	..	..	..	..	..
Abscess ..	432	..	124	..	126	..	1	..	..	2
Cyst ..	3	..	..	..	..	..	..	..	..	..
Guinea Worm ..	2	..	..	..	32	..	..	..	..	..
Cedema ..	1	..	..	..	..	..	..	..	..	..
14. Cutaneous Syst:										
Urticaria ..	18	..	8	..	3	..	..	..	..	..
Lichen ..	13	..	7	..	10	..	..	..	..	..
Psoriasis ..	40	..	13	..	6	..	..	..	..	..
Herpes ..	67	..	22	..	30	..	..	1	..	..

Abstract No. 18—*continued.*

Average Strength ..	Bengal.		Madras.		Bombay.		Invalids sent Home from			India.
	35,452		10,684		10,838					56,974
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	Discharged at Netley.
Eczema	159	..	41	..	57	..	1	..	..	..
Impetigo	11	..	5	..	2	..	..	..	..	..
Ulcer	853	..	426	..	301	..	11	1	1	11
Boil	623	..	296	..	206	..	..	..	..	1
Carbuncle	12	..	4	..	3	..	..	..	..	..
Whitlow	100	..	31	..	48	..	..	..	..	..
Itch	60	..	20	..	13	..	..	..	..	..
Warts	73	..	21	..	13	..	..	..	..	..
Fissures	2	..	..	..	..	..	..	..	..	..
Erythema	15	..	4	..	5	..	..	..	..	..
Molluscum	1	..	..	..	..	..	..	..	..	..
Pemphigus	2	..	7	..	..	..	..	..	..	..
Delhi Boil	52	..	..	..	..	..	2	..	..	..
Rupia	3	..	1	..	1	..	..	1	..	..
Hypertrophy of Skin	1	..	..	..	..	..	..	..	..	..
Acne	4	..	4	..	2	..	..	..	..	..
Synovial Cyst	1	..	..	..	..	..	..	..	..	..
Leucoderma .. ..	..	..	1	..	..	..	..	..	..	..
Serous Cyst of Abdominal Walls ..	1	..	..	..	..	..	..	..	..	..
Corns	3	..	7	..	1	..	..	..	..	..
Irritation by Insects	13	..	2	..	..	..	..	..	..	..
Tumour	11	..	3	..	2	..	..	..	..	..
Ingrown Toe Nail ..	57	..	9	..	9	..	..	..	..	1
Filaria .. ..	..	..	11	..	..	..	..	..	..	..
Tinea	49	..	25	..	5	..	1	..	..	1
Roseola	2	..	..	..	1	..	..	..	..	..
Prurigo	4	..	..	..	1	..	..	..	..	..
Ecthyma	5	..	..	..	1	..	..	..	..	..
Intertrigo	5	..	..	..	..	..	..	..	..	..
Miliaria	1	..	..	..	..	..	..	..	..	..
Sycosis	2	..	..	..	..	..	..	..	..	..
III. Conditions, &c.										
General Debility ..	591	3	512	..	178	..	277	52	27	36
IV. Poisons.										
Delirium Tremens ..	143	7	94	6	67	5	..	..	..	..
Alcohol	3	3	..	..	32	2	..	..	..	..
Stramonium .. ..	..	..	1	..	..	..	..	..	..	..
Vegetable .. ..	..	..	3	..	..	..	..	..	..	..
Fungi	1	..	..	..	..	..	..	..	..	..
Castor Oil Seed ..	1	..	..	..	..	..	..	..	..	..
Opium	1	1	..	..	..	..	..	..	..	..
Snake-bite .. ..	..	..	..	..	2	..	..	..	..	..
Scorpion .. ..	..	..	1	..	..	..	..	..	..	..
V. Injuries.										
2. Accidental:										
Burns and Scalds ..	36	..	12	..	13	..	..	..	..	..
Multiple Injury ..	1	3	1	2	..	..	..	..	..	..

Abstract No. 18—continued.

Average Strength ..	Bengal.		Madras.		Bombay.		Invalids sent Home from			India.
	35,452		10,684		10,838					56,974
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Bengal.	Madras.	Bombay.	Discharged at Netley.
Asphx: by Drowning	..	10	1	5	..	1	..	..	..	..
Contusion ..	1,544	..	592	..	457	..	4	..	..	3
Concuss: of the Brain	8	4	1	1	1	..	..	1	..	..
Fracture ..	188	7	80	2	52	2	9	1	1	8
Wounds ..	394	..	231	..	169	..	..	1	5	2
" from Gunshot	22	1	8	1	..	1	1	..	..	2
Sprain ..	795	..	273	..	205	..	2	..	2	..
Dislocation ..	35	..	4	..	11	..	..	2	1	2
Blisters of the Feet	141	..	23	..	44	..	..	..	..	..
Injury to Spinal Cord	..	..	1	..	..	..	1	..	..	..
Rupture of Muscle ..	1	..	1	..	..	..	..	..	..	..
Asphyxia ..	..	4	..	1	..	..	..	..	..	..
" by Smothering	..	1	..	..	..	..	..	..	..	..
Foreign Bodies ..	4	1	..	..	..	..	..	..	..	..
Rupture of Spleen ..	1	1	..	..	..	..	..	..	..	..
Wound of Eye ..	..	..	..	..	..	..	..	..	..	1
3. Homicidal:										
Wound ..	..	..	..	..	..	..	1	..	..	..
Gun Shot ..	..	..	..	..	3	3	..	..	..	..
Injury ..	..	1	..	..	..	..	..	..	..	..
4. Self-inflicted:										
Multiple Injury ..	1	1	..	..	..	..	..	..	..	..
Concussion of Brain	..	..	1	1	..	..	..	..	..	..
Poisons ..	..	2	..	..	..	..	..	..	..	..
Cut Throat ..	4	..	1	..	2	1	..	..	..	..
Gun Shot ..	2	11	..	7	..	5	..	..	..	..
Wounds ..	1	1	..	..	..	..	..	..	..	..
Hanging ..	..	1	..	1	..	..	..	..	..	..
Injuries not defined	1	..	..	..	..	..	..	..	..	..
Drowning ..	..	4	..	..	..	..	..	..	..	..
5. Judicial:										
Hanging ..	..	..	..	..	..	2	..	..	..	..
VI. Surgical Operations.										
For Strabismus ..	2	..	..	..	..	..	..	..	..	..
Ligature of Femoral Artery ..	1	..	..	..	..	..	..	..	..	..
Amputn: of Thigh ..	..	1	1	..	..	..	..	..	..	2
" of Finger ..	..	..	1	..	..	..	..	..	..	1
" of Arm ..	..	..	..	..	..	..	..	..	1	1
" of Leg ..	..	..	..	..	..	..	..	..	..	..
" (not stated)	8	..	..	..	1	..	2	..	1	..
Puncture of Bladder	..	..	..	..	1	..	..	..	..	..
Strangulated Hernia	..	..	..	..	1	..	..	..	..	..
Removal of fatty tumour ..	1	..	..	..	..	..	..	..	..	..
For Phymosis ..	1	..	..	..	..	..	..	..	..	..
Not yet Diagnosed	2	..	..	..	..	..	..	..	..	..
No apprbl. Disease	22	..	14	..	8	..	..	..	..	..
Total ..	52,528	630	12,944	215	16,236	150	1,664	801	246	913

Abstract No. 18—*continued*.

CAUSES of the Deaths of the Invalids.

	Bengal.	Madras.	Bombay.
Syphilis	1	..	1
Cancer	1	..	1
Phthisis	19	4	1
Diabetes .. .. .	..	1	..
Anæmia	1	..	..
Epilepsy	1	..	..
Mania	1	..	..
Valve disease of Heart	5	..	..
Aneurism of Aorta	1	1	..
Pneumonia.. .. .	1	..	..
Empyema	1	..	..
Pneumothorax	1	..	..
Œdema of Glottis	1	..	..
Peritonitis	1	..	..
Dysentery	4	4	..
Diarrhoea	2	..	1
Hepatitis	3	2	3
Cirrhosis of Liver	1	..	..
Bright's Disease	3	..	..
Urinary Fistula	1	..	..
Psoas Abscess .. .. .	..	1	..
General Debility	1	..	..
Total	50	13	7

Abstract No. 19, showing the Ages of the Troops serving in the Bengal Command, and the Deaths at each Age, during the Year 1871.

Corps.	Under 20.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.		Total.	
	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.
4th Hussars	18	..	158	..	152	..	107	3	40	3	3	..	477	6
5th Hussars	12	..	50	..	181	..	209	3	31	1	6	..	489	6
11th Hussars	46	..	148	..	122	3	125	2	15	2	10	..	461	7
20th " "	20	..	76	..	116	3	200	1	51	3	10	..	473	7
21st " "	8	..	148	1	107	..	158	6	44	1	9	..	469	8
A Brigade, R.H.A.	18	1	216	4	213	8	210	3	74	3	3	1	734	20
F " "	16	..	244	3	283	4	238	1	80	2	7	..	868	10
8th " B.A.	14	..	260	4	283	3	271	11	174	4	22	2	1,024	24
16th " "	14	..	249	6	377	12	280	9	107	5	15	..	1,043	32
19th " "	30	..	249	3	374	2	210	5	135	5	22	3	1,010	18
24th " "	1	..	116	1	125	1	116	10	47	1	9	..	414	13
2nd Battalion 1st Foot	117	3	320	6	245	5	177	1	96	4	8	..	963	19
1st " 3rd	20	..	251	6	288	4	185	5	109	2	3	2	886	19
1st " 5th	38	..	360	8	291	8	141	9	57	3	7	1	889	29
1st " 6th	12	1	387	4	262	6	136	2	52	1	9	2	858	16
1st " 11th	319	..	239	2	174	2	101	2	17	5	1	1	841	12
2nd " 13th	19	..	198	1	313	2	254	2	63	5	15	1	856	11
1st " 14th	134	..	253	3	184	2	171	2	68	4	6	..	811	12
1st " 17th	53	3	363	7	172	5	129	2	40	4	7	..	769	21
2nd " 19th	66	..	288	5	386	1	190	5	62	4	10	1	902	16

Abstract No. 19—continued.

Corps.	Under 20.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.		Total.	
	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.	Strength on 1st Jan.	Died.
2nd Battalion 25th Foot ..	65	1	293	1	427	2	163	6	54	..	3	..	1,005	10
26th Foot ..	31	..	291	1	216	2	168	5	53	2	2	..	761	10
36th " ..	57	1	152	1	233	2	258	2	39	4	10	..	749	10
37th " ..	20	..	304	3	209	5	265	6	29	2	3	2	330	18
38th " ..	50	..	226	1	250	..	215	3	59	1	5	..	305	5
39th " ..	342	1	163	1	232	1	59	2	48	4	10	1	344	10
41st " ..	31	..	247	4	235	4	217	7	32	1	14	2	376	18
55th " ..	8	..	79	..	233	2	361	5	154	1	16	..	351	8
58th " ..	86	..	179	3	231	2	94	2	37	4	2	..	679	11
2nd Battalion 60th Foot ..	37	3	217	6	269	4	297	6	80	2	18	1	378	22
62nd Foot ..	103	..	331	1	162	4	160	2	23	3	7	..	796	9
63rd " ..	178	3	332	6	173	2	192	2	43	3	5	..	923	16
83th " ..	39	..	419	4	188	3	181	4	68	..	6	..	908	10
92nd " ..	34	..	333	4	275	5	148	3	47	3	8	..	845	14
96th " ..	45	2	276	3	261	5	224	7	70	3	8	..	884	20
105th " ..	16	2	223	5	208	4	228	18	66	3	6	..	746	27
106th " ..	37	1	284	1	250	5	180	8	94	6	41	3	886	24
107th " ..	17	..	259	3	142	9	341	9	147	6	5	..	911	27
109th " ..	45	..	139	2	191	1	162	8	244	1	27	2	808	14
	2,261	22	9,249	114	9,068	134	7,411	135	2,793	109	384	25	31,166	589

Abstract No. 19—continued.

Abstract showing the Ages of the Troops serving in the Madras Command, and the Deaths at each Age, during the Year 1871.

	Under 20 Years.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.		Total.	
	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.
16th Lancers	47	..	125	..	127	1	168	1	36	1	4	2	502	5
18th Hussars	26	..	44	4	109	14	196	32	44	4	9	3	438	57
D Brigade Royal Horse Artillery ..	17	..	49	..	90	..	84	1	27	1	11	..	278	2
5th " Royal Artillery ..	7	1	60	1	92	..	61	1	56	1	10	1	286	5
9th " " ..	7	..	114	..	57	1	64	1	38	3	1	2	281	7
20th " " ..	26	1	173	..	138	4	218	7	96	4	21	..	672	16
23rd " " ..	16	..	125	1	165	1	190	5	95	4	29	..	620	11
2nd Battalion 10th Foot ..	159	1	163	1	322	4	178	6	29	6	4	1	860	19
1st " 21st " ..	196	..	284	3	133	1	149	3	46	2	..	..	808	9
2nd " 21st " ..	36	..	152	3	806	4	132	5	43	4	6	1	724	17
2nd " 24th " ..	26	2	281	3	190	4	128	9	65	1	7	..	696	19
45th Foot	206	..	282	2	325	3	120	3	9	2	..	1	944	11
76th " " ..	121	1	287	8	183	5	121	4	68	1	7	1	795	15
89th " " ..	341	..	249	10	184	6	112	3	26	..	..	1	912	20
Total	1,232	6	2,398	31	2,421	48	1,981	81	675	34	109	13	8,796	213

Abstract No. 19—continued.

ABSTRACT showing the Ages of the Troops serving in the Bombay Command, and the Deaths at each Age, during the Year 1871.

	Under 20 Years.		20 and under 25.		25 and under 30.		30 and under 35.		35 and under 40.		40 and upwards.		Total.	
	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.
3rd Hussars..	22	..	167	2	113	3	141	..	23	1	9	..	475	6
15th "	73	..	214	..	76	1	89	3	23	1	1	..	476	3
D Brigade Royal Horse Artillery.	9	..	64	..	71	..	73	1	55	..	5	..	277	2
6th " Royal Artillery	12	..	198	3	108	2	77	..	57	2	10	1	463	7
9th "	35	..	150	1	175	4	139	7	71	3	8	..	568	15
18th "	6	1	164	2	307	2	217	4	108	3	40	..	843	12
1st Battalion 2nd Foot..	102	..	400	3	200	2	121	..	73	3	7	..	903	8
1st " 8th "	100	..	373	7	262	3	107	3	47	2	3	..	892	15
49th Foot ..	169	1	342	2	205	3	119	3	53	5	1	1	889	15
59th "	86	2	490	5	161	1	122	3	64	2	18	1	891	14
66th "	265	1	297	6	112	2	123	3	76	2	1	1	874	15
83rd "	103	2	411	2	257	2	75	3	40	1	3	..	889	10
108th "	64	..	259	2	287	8	186	4	75	6	9	..	880	20
3rd Battalion Rifle Brigade	7	..	74	..	219	1	265	4	59	2	5	..	623	7
Total ..	1,008	7	3,603	35	2,563	34	1,844	38	824	33	120	4	9,947	151

APPENDIX No. XV—continued.

ABSTRACT No. 20, showing the Cases of Sickness and Deaths among Troops on board Ship, proceeding on and returning from Foreign Service, and proceeding from one Colony or Station to another.

	Passage Out.		Passage Home.		Intercolonial.					
	To Medi- terranean, America, Cape, Ceylon, and Japan.	To India via Egypt.	From Medi- terranean, Mauritius, Cape, and British America.	From India via Egypt.	White Troops.	Black Troops.				
Embarked	2,185	9,266	1,210	4,460	2,781	198				
Average Annual Strength .. }	245	925	152	415	186	24				
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. General Diseases.										
1. Febrile :										
Small Pox .. ..	..	..	..	..	..	1	..	..	..	..
Measles .. ..	..	..	1	..	..	..	..	..	..	..
Scarlet Fever ..	..	..	19	1	..	..	..	..	..	..
Typhus Fever ..	..	..	1	..	..	..	..	..	..	..
Simple Cont : Fever	3	..	18	..	..	4	..	..	..	..
Febricula	1	..	3	..	..	2	..	6	..	..
Ague	2	..	2	..	4	..	48	..	8	..
Remittent Fever ..	..	..	..	..	..	1	1	65	..	..
Influenza .. ..	..	..	1	..	..	..	..	..	..	..
Erysipelas	1	..	4	..	..	..	..	1	..	..
2. Constitutional :										
Acute Rheumatism	3	..	19	..	3	..	2	..	3	..
Chronic .. ..	..	..	2	..	1	..	8	..	..	..
Muscular	1	..	2	..	..	..	1	..	..	..
Chro: Osteo-Arthritis	..	..	..	..	1	..	..	..	..	..
Primary Syphilis ..	18	..	90	..	4	..	27	..	25	..
Secondary	4	..	11	..	..	..	6	..	3	..
Scrofula .. ..	..	..	..	..	..	..	1	..	..	..
Phthisis Pulmonalis	..	..	5	1	1	..	1	1	2	..
Hæmoptysis (Tub:)	..	..	1	..	..	..	..	..	..	..
Purpura .. ..	..	..	1	..	..	1	..	..	..	..
Scurvy	1	..	1	..	..	..	..	1	..	..
Anæmia .. ..	..	..	..	..	..	1	..	..	..	..
General Dropsy ..	..	..	..	..	..	1	..	..	..	..
II. Local Diseases.										
1. Diseases of the Nervous System :										
Apoplexy .. ..	..	..	1	1	..	..	..	..	..	..
Sunstroke	1	..	1	..	..	..	..	5	1	..
Paralysis .. ..	..	..	..	..	..	1	..	..	..	..

Abstract No. 20—continued.

	Passage Out.				Passage Home.				Intercolonial.			
	To Medi- terranean, America, Cape, Ceylon, and Japan.		To India via Egypt.		From Medi- terranean, Mauritius, Cape, and British America.		From India via Egypt.		White Troops.		Black Troops.	
Embarked	2,185		9,266		1,210		4,460		2,781		198	
Average Annual Strength .. }	245		924		152		415		186		24	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Epilepsy	3	..	4	..	..	..	..	..	..	..	..	..
Neuralgia	1	..	..	..	..	..	..	..	1	..	..	..
Dementia .. ..	..	..	2	..	..	..	..	..	..	..	..	..
2. Diseases of the Eye :												
Conjunctivitis .. ..	..	..	15	..	5	..	8	..	..	..	..	..
Tarsal Ophthalmia..	..	..	1	..	..	..	..	..	..	..	..	..
Scleritis	1	..	..	..	..	..	..	..	..	..	..	..
Hordeolum .. ..	..	..	..	..	..	..	1	..	..	..	..	..
3. Diseases of the Ear :												
Deafness .. ..	..	..	1	..	..	..	..	..	..	..	..	..
5. Circulatory Syst.:												
Palpitation of Heart	..	..	1	..	..	..	..	..	..	..	..	..
Aneurism of Aorta	..	..	..	..	1	1	..	..	..	..	..	..
6. Absorbent System:												
Inflam. of Glands ..	2	..	7	..	..	..	3	..	2	..	..	..
Suppuration ..	..	..	3	..	..	..	..	..	..	..	..	..
8. Respiratory Syst.:												
Bronchitis .. ..	..	..	31	..	8	..	13	1	4	..	..	..
Asthma .. ..	..	..	..	..	2	..	..	..	1	..	..	..
Pneumonia	1	..	10	1	..	..	3	..	4	..	..	..
Pleurisy .. ..	..	..	3	..	..	..	..	..	..	..	..	..
9. Digestive System:												
Crancum Oris .. ..	..	..	1	..	..	..	..	..	..	..	..	..
Tonsillitis	11	..	32	..	2	..	2	..	1	..	..	..
Hæmatemesis	1	..	..	..	..	..	..	..	..	..	..	..
Dyspepsia	3	..	4	..	..	..	2	..	11	..	..	..
Dysentery .. ..	..	..	1	..	..	..	16	2	1	..	..	..
Diarrhoea .. ..	..	..	6	..	3	..	10	1	13	1	..	..
Hernia	1	..	..	..	..	..	..	..	..	..	..	..
Colic	1	..	1	..	..	..	1	..	..	..	..	..
Constipation .. ..	..	..	1	..	..	..	..	..	..	..	..	..
Hepatitis	2	..	1	..	1	..	13	1	..	..	..	..
Congestion of Liver	..	..	..	..	..	..	..	..	2	..	..	..
Jaundice .. ..	..	..	6	..	1	1	1	..	1	..	..	..

Abstract No. 20—continued.

	Passage Out.				Passage Home.				Intercolonial.			
	To Mediterranean, America, Cape, Ceylon, and Japan.		To India via Egypt.		From Mediterranean, Mauritius, Cape, and British America.		From India via Egypt.		White Troops.		Black Troops.	
Embarked	2,185		9,266		1,210		4,460		2,781		198	
Average Annual Strength .. }	245		925		152		415		186		24	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Ascites .. ..	..	..	..	..	..	..	..	1	..	..	..	..
Sea Sickness ..	1	..	..	..	..	..	..	..	..	..	..	..
10. Urinary System :												
Gonorrhoea	22	..	97	..	5	..	8	..	14	..	1	..
Phymosis, &c. ..	..	..	1	..	..	..	..	..	..	..	..	..
Bubo	1	..	..	..	..	..	1	..	..	..	..	..
Epididymitis (Gon.)	1	..	4	..	..	..	3	..	..	..	..	..
Stricture of Urethra	..	..	1	..	..	..	2	..	..	..	..	..
Irritability of Bladder	..	..	..	..	1	..	..	..	..	..	..	..
11. Generative Syst.:												
Varicocele .. ..	..	..	..	..	..	..	1	..	..	..	..	..
Orchitis	1	..	6	..	1	..	3	..	1	..	..	..
Sarcocoele .. ..	..	..	..	..	..	..	..	..	1	..	..	..
12. Organs of Locomotion.												
Ostitis .. ..	..	..	..	..	..	..	1	..	..	..	..	..
Acute Synovitis ..	..	..	2	..	..	..	..	..	..	..	..	..
Cyst of Knee Joint..	1	..	..	..	..	..	..	..	..	..	..	..
13. Diseases of Cellular Tissue.												
Inflam: of Cell: Tis:	..	..	1	..	1	..	2	..	..	..	..	..
Abscess „ „	6	..	10	..	3	..	5	..	6	..	..	..
14. Cutaneous Syst.:												
Psoriasis .. ..	..	..	2	..	..	..	1	..	1	..	..	..
Herpes .. ..	..	..	1	..	..	..	..	..	..	..	..	..
Eczema .. ..	..	..	3	..	1	..	..	..	1	..	1	..
Erythema .. ..	..	..	..	..	..	..	..	..	1	..	..	..
Porrigio .. ..	..	..	1	..	..	..	..	..	..	..	..	..
Ulcer	2	..	10	..	11	..	7	..	4	..	..	..
Boil	5	..	8	..	1	..	6	..	1	..	..	..
Carbuncle .. ..	..	..	2	..	1	..	..	..	..	..	..	..
Whitlow	1	..	3	..	..	..	..	..	..	..	..	..
Itch	2	..	13	..	..	..	1	..	..	..	..	..
Warts .. ..	..	..	2	..	..	..	..	..	..	..	..	..
Ingrown Nail ..	..	..	2	..	..	..	..	..	..	..	..	..

Abstract No. 20—continued.

	Passage Out.				Passage Home.				Intercolonial.			
	To Mediterranean, America, Cape, Ceylon, and Japan.		To India via Egypt.		From Mediterranean, Mauritius, Cape, and British America.		From India via Egypt.		White Troops.		Black Troops.	
Embarked	2,185		9,266		1,210		4,460		2,781		189	
Average Annual Strength .. }	245		925		152		415		186		24	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
III. Conditions, &c.												
General Debility ..	..	..	1	..	3	..	2	..	1	..	..	..
IV. Poisons.												
Delirium Tremens ..	..	..	..	..	1	1	..	..	3	1	..	..
V. Injuries.												
2. Accidental:												
Burns and Scalds ..	1	..	3	..	5	..	3	..	..	..	..	..
Contusion	1	..	23	..	1	..	4	..	3	..	..	..
Concussion of Brain	1	..	..	..	..	..	..	..	..	..	..	..
Fracture .. ..	..	..	3	..	1	..	..	..	1	..	..	..
Wounds	3	..	5	..	3	..	1	..	..	..	..	..
Sprain	2	..	9	..	1	..	2	..	..	..	..	..
Dislocation .. ..	..	..	1	..	..	..	..	..	..	..	..	..
Total	108	..	523	4	77	3	231	9	193	3	6	..

APPENDIX No. XVI.

ABSTRACT of Results of Meteorological Observations taken at Home
Stations in the Year 1871.

APPENDIX

ABSTRACT of Results of Meteorological Observations taken

ALDERSHOT CAMP.

Lat. 51° 15' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	29.447	29.865	28.542	46.6	17.0	29.6	37.2	28.6	8.6	32.9	49.6	25.9	33.7	32.3
February	29.650	30.066	28.848	55.8	25.8	30.0	48.3	36.7	11.6	42.5	69.2	33.8	43.5	41.3
March	29.677	30.091	28.907	70.0	28.6	42.0	55.5	36.5	19.0	46.0	90.8	32.9	48.1	43.7
April	29.453	29.801	28.814	66.0	29.0	37.0	58.2	41.5	16.7	49.8	100.2	33.1	52.0	47.5
May	29.717	29.981	29.449	80.6	32.8	47.8	64.6	41.9	22.7	53.3	115.5	39.3	57.4	49.9
June	29.568	29.907	29.153	75.4	35.6	39.8	66.4	47.3	19.1	56.8	118.7	45.0	58.4	43.9
July	29.504	29.852	29.057	83.2	46.2	37.0	72.3	53.3	19.0	62.7	121.7	50.6	64.9	50.6
August	29.678	30.113	29.099	90.0	45.0	45.0	78.0	53.2	24.8	65.6	123.0	49.7	70.0	63.1
September	29.517	29.891	28.760	81.2	39.8	41.4	66.5	49.6	16.9	58.0	101.9	45.7	59.8	56.1
October	29.587	30.034	28.816	64.0	31.8	32.2	58.9	42.1	16.8	50.5	86.2	38.8	52.6	49.9
November	29.622	30.021	29.108	52.0	21.0	31.0	44.4	32.3	12.1	38.3	66.3	29.6	39.2	37.1
December	29.734	30.113	28.990	49.4	18.4	31.0	42.9	33.0	9.9	37.9	57.0	29.0	38.7	37.4
Yearly Sum, Means, and Totals	29.596	29.978	28.963	68.0	30.9	37.1	57.7	41.3	16.4	49.5	91.7	38.2	51.5	47.7

CANTERBURY.

Lat. 51° 17' N.

January ...	...	...	...	47.2	11.0	36.2	38.6	25.6	13.0	32.1	...	...	33.7	32.3
February ...	...	...	...	58.0	22.0	36.0	49.6	33.2	16.4	41.4	...	...	44.5	43.1
March ...	...	...	...	71.0	25.0	46.0	55.2	33.2	22.0	44.2	...	...	48.0	45.7
April ...	...	...	...	69.0	26.2	41.8	58.3	40.0	18.3	40.0	...	...	52.4	50.0
May ...	...	...	...	81.0	34.0	47.0	63.0	40.1	22.9	51.5	...	...	57.0	44.0
June ...	...	...	...	82.8	34.5	48.3	66.1	45.4	20.7	56.7	...	...	59.5	57.0
July ...	...	...	...	85.0	39.0	46.0	73.9	49.4	24.5	61.6	...	...	66.6	63.9
August ...	...	...	...	88.0	41.0	47.0	78.1	48.6	29.5	63.3	...	...	71.7	68.0
September ...	...	...	...	86.5	31.7	54.8	68.9	44.6	24.3	56.7	...	...	62.7	60.5
October ...	...	...	...	69.3	26.0	43.3	61.3	36.7	24.6	49.0	...	...	39.8	38.9
November ...	...	...	...	54.5	13.7	40.8	45.3	26.3	19.0	35.8	...	...	39.9	38.6
December ...	...	...	...	51.0	4.0	47.0	43.1	28.2	14.9	35.6	...	...	39.9	38.6
Yearly Sum, Means, and Totals ...	...	...	...	70.1	25.7	44.4	59.4	37.6	20.8	49.0	...	...	52.3	50.2

CHATHAM.

Lat. 51° 23' N.

January ...	29.665	30.213	28.767	47.3	16.8	30.5	39.6	25.1	14.5	32.3	66.1	24.1	33.8	33.3
February ...	29.868	30.271	29.071	59.2	20.0	39.2	50.0	33.7	16.3	41.8	76.7	31.8	44.1	43.0
March ...	29.878	30.352	29.111	69.2	25.8	43.4	55.3	33.8	21.5	44.5	86.2	31.3	47.6	46.2
April ...	29.666	30.051	29.066	68.3	24.2	44.1	58.9	37.5	21.4	48.2	92.8	35.5	51.4	48.3
May ...	29.916	30.226	29.677	82.2	29.9	52.3	65.0	39.0	26.0	52.0	104.3	36.8	56.2	54.2
June ...	29.770	30.104	29.433	78.2	34.6	44.2	67.3	43.8	23.5	55.5	104.4	42.9	58.4	56.4
July ...	29.708	30.057	29.240	85.8	44.1	41.7	73.6	50.4	23.2	62.0	114.7	49.3	65.7	63.6
August ...	29.881	30.331	29.346	83.3	43.9	39.4	76.2	51.3	24.9	63.7	114.7	48.5	69.4	66.6
September ...	29.773	30.465	29.096	84.6	37.0	47.5	69.3	47.9	21.4	58.6	100.2	46.4	61.1	58.7
October ...	29.814	30.356	29.007	70.2	29.2	41.0	60.2	39.1	21.1	49.6	85.4	36.9	52.8	51.5
November ...	29.839	30.304	29.414	57.8	19.8	38.0	46.7	30.0	15.7	37.8	68.1	28.4	39.5	38.5
December ...	29.963	30.353	29.312	51.7	13.7	38.0	44.1	30.5	13.6	37.3	63.1	29.6	39.1	38.3
Yearly Sum, Means, and Totals ...	29.810	30.267	29.212	69.6	28.2	41.6	58.8	38.5	20.3	48.6	89.7	36.0	51.6	50.0

No. XVI.

at Stations in England and Scotland in the Year 1871.

Long. 0° 45' W. Height above Sea 325 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hori- zontal Movement of the Air.				On the Ground.	25 Feet above the Ground.
31.5	.177	2.1	0.2	90.8	558.3	8.00	7.50	9.50	6.00	0.00	lbs. per sq. foot	Miles	8.7	2.8	18	2.41	1.64
30.8	.246	2.8	0.4	83.9	545.6	3.50	3.50	9.50	11.50	0.00	...	238.2	8.6	2.5	15	1.48	0.99
30.9	.237	2.7	1.1	70.7	542.4	6.50	5.00	11.00	8.50	0.00	...	308.0	7.0	2.4	14	1.50	0.90
42.9	.276	3.1	1.2	71.5	532.9	5.50	5.50	6.50	12.50	0.00	...	277.1	7.9	2.6	14	3.31	2.42
43.1	.278	3.1	2.1	59.0	532.0	12.00	9.00	3.50	6.50	0.00	...	224.6	6.6	2.5	8	0.58	0.45
49.9	.360	4.0	1.4	73.5	527.9	11.00	4.50	5.50	9.00	0.00	...	211.3	8.3	2.8	18	3.41	2.88
55.2	.437	4.8	2.0	71.4	518.7	2.50	0.50	11.50	16.50	0.00	...	275.3	7.5	3.0	15	3.78	2.76
57.8	.479	5.2	2.8	65.4	517.4	5.50	7.50	9.50	8.50	0.00	...	200.2	6.2	2.3	8	1.80	1.37
52.8	.400	4.5	1.3	78.6	526.2	8.00	10.00	6.00	6.00	0.00	...	214.3	7.9	2.4	12	4.36	3.62
47.2	.326	3.7	0.8	82.0	534.5	4.50	6.50	12.50	7.50	0.00	...	186.5	8.1	1.9	16	1.87	1.51
34.4	.199	2.3	0.5	83.2	550.3	11.00	8.50	3.00	7.50	0.00	...	198.1	7.7	1.5	12	0.49	0.37
35.6	.210	2.4	0.3	89.7	552.1	6.00	1.00	8.00	16.00	0.00	...	241.4	7.8	2.1	17	1.98	1.44
44.1	.302	3.1	1.2	76.9	536.0	84.00	69.00	96.00	116.00	00.0	...	236.1	7.7	2.4	167	27.93	20.35

Long. 1° 5' E. Height above Sea 80 feet.

31.2	.175	2.1	0.2	89.3	...	11.25	6.00	6.00	7.75	0.00	...	...	...	7.0	1.8	11	2.15	...
41.5	.261	3.0	0.4	89.3	...	3.00	3.75	7.25	14.00	0.00	...	...	...	6.8	2.3	10	1.96	...
43.2	.278	3.2	0.6	83.9	...	4.00	7.50	8.75	9.75	1.00	...	...	...	5.1	1.5	12	0.86	...
47.6	.330	3.7	0.7	84.6	...	4.00	5.00	5.00	16.00	0.00	...	...	...	6.4	2.2	16	2.66	...
51.2	.377	4.2	1.0	81.0	...	12.50	11.25	2.00	5.25	0.00	...	...	...	4.9	1.3	8	0.63	...
54.8	.429	4.8	0.9	85.0	...	10.75	5.00	4.75	4.00	5.50	...	...	...	4.8	4.5	17	2.38	...
61.7	.561	6.0	1.1	84.5	...	4.75	0.75	11.25	12.25	2.00	...	...	...	4.0	5.2	18	2.15	...
58.1	.621	6.8	1.7	79.5	...	6.00	6.75	6.00	9.75	2.50	...	...	...	3.2	5.0	4	0.73	...
58.6	.484	5.5	0.9	86.8	...	10.00	8.00	4.25	6.75	1.00	...	...	...	4.4	5.1	16	5.15	...
...	...	...	...	...	...	6.50	4.00	8.75	6.75	5.00	...	...	...	...	...	...	...	...
37.7	.227	2.7	0.2	92.3	...	8.00	8.75	4.75	7.00	1.50	...	...	...	4.0	2.8	12	0.97	...
37.4	.224	2.6	0.2	91.2	...	6.50	1.25	7.25	15.00	1.00	...	...	...	4.8	3.0	4	1.36	...
48.2	.360	3.1	0.7	79.0	...	67.25	68.00	76.00	114.25	19.50	...	...	...	5.0	8.1	188	90.80	...

Long. 0° 32' E. Height above Sea 160 feet.

32.3	.181	2.0	0.0	94.5	557.2	7.35	5.25	14.25	3.25	1.00	...	209.6	6.8	2.0	16	2.89	2.81
41.7	.261	3.0	0.3	91.3	548.7	2.00	2.75	11.00	11.25	1.00	...	209.6	7.0	2.4	12	1.57	1.39
44.7	.295	3.3	0.4	90.2	548.1	4.00	7.00	9.25	9.75	1.00	...	209.6	4.9	2.5	12	1.57	1.35
48.2	.338	3.8	0.5	89.2	536.8	2.50	6.75	5.25	15.00	0.50	...	209.6	6.5	3.5	18	2.81	2.21
52.3	.384	4.4	0.6	87.0	536.1	9.75	9.75	4.00	7.50	0.00	...	209.6	4.9	2.5	9	1.08	1.01
56.4	.439	4.9	0.6	89.4	531.0	7.50	7.50	6.50	7.00	0.00	...	209.6	6.8	4.0	17	2.62	2.32
61.9	.555	6.1	0.7	87.4	521.7	2.00	2.25	15.75	11.00	0.00	...	212.6	5.5	4.4	16	3.25	3.01
64.4	.604	6.7	1.2	84.0	520.7	1.75	11.25	10.50	7.50	0.00	...	208.6	3.4	3.5	7	1.79	1.76
56.6	.459	5.1	0.9	85.7	528.0	8.25	10.75	4.25	6.25	0.50	...	229.2	4.3	2.8	13	2.62	2.40
50.2	.364	4.1	0.4	91.7	538.1	2.25	4.50	13.00	7.75	3.50	...	139.4	5.2	1.6	9	1.33	1.29
37.2	.221	2.0	0.2	92.0	553.8	5.75	7.75	3.50	8.50	4.50	...	178.9	5.3	1.7	10	0.60	0.56
37.3	.223	2.6	0.2	93.6	556.5	4.00	0.75	12.25	13.50	0.50	...	232.8	6.3	4.2	14	1.48	1.45
48.5	.367	4.0	0.5	89.7	538.5	58.50	76.25	106.50	108.25	12.50	...	208.6	5.7	2.9	153	22.92	21.76

* 30 Feet above the ground.

Appendix

COLCHESTER.

Lat. 51° 53' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January ...	29.697	30.159	28.783	48.1	16.6	31.5	46.3	25.4	20.9	35.8	51.8	20.7	31.2	33.3
February ...	29.878	30.273	29.085	56.0	20.0	36.0	50.4	33.7	16.7	42.0	67.8	27.5	41.1	42.0
March ...	30.921	30.448	29.297	69.8	25.6	44.3	55.0	32.9	22.1	43.9	91.0	25.5	48.6	45.1
April ...	29.690	30.094	29.035	66.1	25.4	40.7	57.9	37.5	20.4	47.7	97.1	39.9	51.5	47.6
May ...	29.943	30.266	29.685	76.4	30.7	45.7	64.0	39.1	24.9	51.5	106.7	37.9	56.9	50.7
June ...	29.786	30.104	29.407	80.6	34.4	46.2	65.8	43.9	21.9	54.8	107.4	43.4	59.0	53.9
July ...	29.713	30.028	29.232	81.5	42.4	39.1	73.1	49.8	23.3	61.4	116.0	48.9	67.4	60.3
August ...	29.894	30.338	29.296	87.6	39.9	47.7	78.3	51.2	27.1	64.7	125.0	49.2	72.4	63.7
September ...	29.762	30.181	29.087	83.8	33.9	49.9	68.9	46.5	22.4	57.7	103.3	46.8	62.6	57.1
October ...	29.631	30.367	28.983	66.5	27.6	38.9	59.7	38.5	21.2	49.1	87.9	37.1	53.8	50.9
November ...	29.849	30.363	29.316	52.5	19.2	33.3	49.3	29.5	19.6	39.4	55.7	28.5	40.3	38.2
December ...	29.956	30.348	29.304	49.4	10.2	39.2	45.1	29.3	15.6	37.2	51.6	28.9	38.9	37.6
Yearly Sums, Means, and Totals ...	29.826	30.246	29.210	68.2	27.2	41.0	59.5	38.1	21.4	48.4	88.4	34.4	55.8	48.4

DEVONPORT.

Lat. 50° 17' N.

January ...	29.576	30.064	28.625	50.2	13.8	36.4	44.0	28.1	15.9	36.0	63.7	18.7	38.8	37.1
February ...	29.807	30.290	29.154	58.4	25.6	32.8	51.9	37.1	14.8	44.5	76.9	28.3	46.9	45.4
March ...	29.797	30.328	29.210	66.2	26.6	39.6	56.5	36.5	20.0	46.5	97.8	27.8	50.6	46.7
April ...	29.610	29.937	28.930	67.0	27.2	39.8	60.1	41.0	19.1	50.5	102.7	34.8	54.1	50.7
May ...	29.860	30.122	29.581	80.0	29.6	50.4	67.1	40.7	26.4	53.9	118.8	37.9	60.0	54.4
June ...	29.732	30.094	29.327	77.2	36.6	40.6	69.0	45.2	23.8	57.1	116.1	38.0	62.3	57.5
July ...	29.658	30.010	29.290	78.1	41.6	36.5	70.6	50.1	20.5	60.3	116.3	44.0	64.7	61.2
August ...	29.795	30.291	29.020	83.8	42.0	41.8	75.6	51.3	24.3	63.4	123.1	44.1	70.1	60.5
September ...	29.639	29.994	28.677	78.4	31.0	47.4	67.4	46.7	20.7	57.0	104.0	40.2	61.4	57.3
October ...	29.687	30.203	29.077	67.2	32.4	34.8	61.3	43.1	18.2	52.2	90.4	40.1	56.5	53.3
November ...	29.750	30.178	29.305	57.8	19.6	38.2	50.1	33.6	16.5	41.8	75.3	30.1	44.6	41.4
December ...	29.912	30.348	29.292	54.2	19.4	34.8	47.9	29.4	18.5	38.6	66.1	24.4	41.4	39.4
Yearly Sums, Means, and Totals ...	29.735	30.154	29.086	68.2	29.0	39.2	60.1	40.2	19.9	50.2	96.0	33.6	54.3	50.4

DOVER.

Lat. 51° 8' N.

January ...	...	...	...	44.0	16.0	28.0	37.0	24.0	13.0	30.5	...	...	34.2	33.1
February ...	...	...	...	52.0	12.0	40.0	48.4	31.6	14.8	39.0	...	...	42.9	41.1
March ...	...	...	...	64.0	23.0	41.0	51.2	34.4	16.8	42.8	...	...	46.5	43.0
April ...	...	...	...	67.0	31.0	36.0	58.0	37.7	15.3	45.3	...	...	47.0	45.8
May ...	...	...	...	77.0	34.0	43.0	59.2	39.7	19.5	49.4	...	...	54.6	50.2
June ...	...	...	...	79.0	36.0	43.0	62.2	43.8	18.4	53.0	...	...	56.9	53.3
July ...	...	...	...	77.0	45.0	32.0	67.3	49.1	18.2	58.2	...	...	63.3	59.8
August ...	...	...	...	85.0	45.0	40.0	73.0	52.5	20.5	62.7	...	...	68.9	65.2
September ...	...	...	...	77.0	38.0	39.0	65.8	46.7	19.1	56.2	...	...	61.7	58.3
October ...	...	...	...	61.0	33.0	28.0	56.8	41.0	15.8	48.9	...	...	53.8	49.6
November ...	...	...	...	52.0	25.0	27.0	43.4	30.1	13.3	36.7	...	...	40.4	37.4
December ...	...	...	...	47.0	16.0	31.0	41.2	29.5	11.7	35.3	...	...	38.7	37.0
Yearly Sums, Means, and Totals ...	...	...	...	65.2	29.5	35.7	54.7	38.3	16.4	46.5	...	...	50.7	47.8

No. XVI—continued.

Long. 0° 54' E. Height above Sea 109 feet.

Hygrometrical Results from Gladstair's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pre- sure of Wind.	Mean daily Hor- izontal Movement of the Air.				On the Ground.	20 Feet above the Ground.
31.7	.179	2.1	0.2	90.2	507.4	8.50	6.00	9.25	7.25	0.00	...	Miles. 174.9	8.3	3.6	12	1.33	1.19
39.5	.243	2.8	0.5	84.6	549.3	3.50	4.25	10.75	9.50	0.00	...	220.6	8.6	2.1	10	1.74	1.60
41.3	.260	2.9	0.9	76.1	546.2	4.50	6.00	10.25	9.75	0.50	...	187.8	6.1	2.5	9	1.23	1.12
43.6	.285	3.2	1.1	75.1	537.7	6.00	6.00	7.50	10.50	0.00	...	185.8	8.3	3.1	18	2.89	2.67
45.0	.300	3.3	1.8	64.9	536.3	12.25	9.00	3.75	6.00	0.00	...	171.0	6.3	4.7	7	0.97	0.90
49.3	.352	4.0	1.6	70.5	531.2	11.75	7.00	4.75	6.50	0.00	...	164.4	8.3	5.1	14	2.07	1.90
54.7	.428	4.7	2.7	63.6	521.0	3.50	2.50	10.00	15.00	0.00	...	179.9	8.1	5.0	17	2.97	2.76
57.2	.470	5.2	3.4	58.6	518.9	3.00	9.25	11.50	7.25	0.00	...	165.6	4.9	4.4	5	0.67	0.63
52.4	.395	4.4	1.9	69.5	526.2	6.75	11.75	6.00	5.50	0.50	...	176.0	7.5	5.1	11	4.27	4.08
48.1	.335	3.8	0.9	80.6	537.3	5.00	5.75	10.50	9.75	0.00	...	157.2	6.7	2.6	6	0.93	0.92
35.5	.238	2.4	0.5	83.5	553.1	10.00	8.00	4.50	7.50	0.00	...	150.3	6.3	2.3	9	0.63	0.56
36.3	.216	2.5	0.2	81.9	556.6	7.00	1.75	7.00	15.25	0.00	...	142.1	7.9	2.1	15	1.73	1.51
44.5	.306	3.4	1.3	75.9	539.3	81.75	77.25	95.75	109.75	0.50	...	148.0	7.1	3.5	133	21.48	19.84

Long. 4° 5' W. Height above Sea 35 feet.

31.8	.203	2.3	0.4	86.3	549.8	7.75	10.00	5.00	7.25	1.00	...	161.2	7.8	4.1	19	3.96	3.67
43.7	.286	3.2	0.4	89.5	544.6	2.75	5.50	10.00	9.75	0.00	...	198.6	8.6	4.3	21	2.85	2.62
42.6	.273	3.1	1.0	75.2	540.7	5.00	10.75	8.25	7.00	0.00	...	254.1	6.2	3.8	12	2.12	1.94
47.4	.326	3.7	1.0	77.7	533.3	2.75	7.25	8.25	11.75	0.00	...	192.5	7.9	5.6	18	6.01	5.57
49.5	.354	3.9	1.9	68.0	531.4	5.25	15.50	4.25	6.00	0.00	...	250.8	5.3	4.7	4	0.19	0.16
53.4	.409	4.5	1.7	73.0	528.4	7.50	6.25	8.25	8.00	0.00	...	267.5	7.1	5.4	13	2.04	1.85
56.3	.439	5.3	1.4	79.7	522.3	1.00	3.25	13.25	13.50	0.00	...	262.7	7.6	5.5	20	5.96	5.50
60.2	.523	5.7	2.3	70.6	519.2	2.75	11.50	9.75	7.00	0.00	...	153.4	5.7	3.9	10	2.43	2.31
52.6	.414	4.6	1.5	76.5	525.6	5.00	13.25	8.75	6.00	0.00	...	234.9	7.0	4.2	15	5.09	4.82
50.3	.366	4.1	1.0	79.8	531.8	3.25	10.00	8.50	8.75	0.50	...	206.3	7.9	4.2	19	4.68	4.63
37.7	.226	2.6	0.7	76.2	546.6	9.50	13.00	3.00	4.00	0.50	...	214.4	7.5	4.4	11	1.40	1.29
36.9	.220	2.5	0.6	84.5	553.1	7.50	3.50	6.75	10.75	2.50	...	151.8	7.3	3.8	12	4.01	3.75
47.3	.341	3.8	1.2	77.2	535.4	60.00	109.75	91.00	99.75	4.50	...	211.6	7.2	4.5	175	40.92	38.10

Long. 1° 19' E. Height above Sea 325 feet.

31.2	.176	2.1	0.2	88.2	...	5.00	6.75	8.75	10.50	...	...	...	8.0	4.1	19	1.89	...
38.9	.237	2.7	0.4	85.6	...	1.75	1.75	9.00	16.50	...	...	...	7.3	4.5	12	2.18	...
39.0	.233	2.7	0.9	76.0	...	3.50	8.25	9.25	10.00	...	...	...	4.9	4.6	10	1.07	...
44.5	.293	3.4	0.3	91.6	...	4.25	6.75	6.25	12.75	...	...	...	6.2	4.5	17	4.15	...
46.0	.309	3.5	1.3	72.2	...	4.00	15.25	4.50	7.25	...	...	...	4.4	4.7	7	0.87	...
49.9	.360	4.0	1.2	77.4	...	5.50	11.00	7.00	6.50	...	...	...	6.5	4.7	18	2.77	...
56.9	.464	5.1	1.3	79.8	...	0.75	2.25	12.75	15.25	...	...	...	4.7	4.5	12	2.26	...
62.2	.561	6.1	1.7	79.5	...	2.00	10.00	9.00	10.00	...	...	...	3.4	4.7	4	0.75	...
55.4	.439	4.8	1.3	80.3	...	2.00	10.00	7.75	10.25	...	...	...	5.1	4.3	14	4.39	...
45.5	.304	3.4	1.2	73.6	...	3.75	7.00	6.75	13.50	...	...	...	4.4	4.2	7	1.31	...
33.6	.193	2.2	0.7	76.8	...	10.00	13.00	4.00	3.00	...	...	...	5.4	4.0	7	3.18	...
34.7	.202	2.3	0.4	86.1	...	7.75	2.50	7.00	13.75	...	...	...	6.8	4.2	13	2.54	...
44.8	.315	3.4	0.9	80.6	...	50.25	94.50	92.00	128.25	...	...	...	5.6	4.4	130	27.34	...

Appendix

GUERNSEY.

Lat. 49° 33' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January ...	29.541	30.026	28.894	49.8	28.7	21.1	42.2	34.2	8.0	38.2	65.2	28.2	39.1	37.2
February ...	29.788	30.221	29.094	60.1	31.9	28.2	50.4	40.6	9.8	45.5	82.9	35.1	46.3	45.0
March ...	29.774	30.148	29.167	65.4	32.3	33.1	54.1	40.7	13.4	47.4	102.1	34.5	48.5	46.0
April ...	29.586	29.890	28.966	69.6	36.9	32.7	58.8	44.7	14.1	51.7	106.9	30.4	52.5	50.4
May ...	29.751	30.069	29.508	86.1	38.8	47.3	63.7	46.0	17.7	54.8	122.7	40.3	56.1	52.4
June ...	29.690	30.036	29.314	71.9	44.8	27.1	65.5	49.5	16.0	57.5	132.2	45.3	57.6	54.7
July ...	29.651	30.018	29.254	92.1	48.4	43.7	70.9	53.3	17.6	62.1	123.7	49.5	63.1	59.6
August ...	29.767	30.223	29.061	89.8	52.0	37.8	75.8	56.5	19.3	68.1	119.6	52.5	66.9	63.1
September ...	29.588	29.886	28.794	82.0	46.8	35.2	67.0	52.9	14.1	59.9	101.3	48.0	61.4	58.4
October ...	29.681	30.153	29.084	63.5	43.2	20.3	58.6	48.6	10.0	53.6	92.4	42.3	55.4	52.2
November ...	29.674	30.125	29.282	60.4	34.0	28.4	48.2	38.7	9.5	43.4	86.9	32.9	45.0	43.4
December ...	29.872	30.287	29.056	51.6	27.2	24.4	46.1	36.5	9.6	41.3	58.2	30.5	43.5	41.0
Yearly Sums, Means, and Totals ...	29.699	30.099	29.104	70.1	38.7	31.4	58.4	45.2	13.2	51.8	97.0	39.9	52.9	50.2

JERSEY.

Lat. 49° 11' N.

January ...	29.758	30.265	28.935	50.0	22.0	28.0	43.6	30.4	13.2	37.0	...	...	38.0	36.3
February ...	30.004	30.440	29.301	57.0	31.0	26.0	51.7	38.6	15.1	44.1	...	...	45.5	44.0
March ...	29.988	30.351	29.363	69.0	30.0	39.0	57.1	38.1	19.0	47.6	...	...	46.4	46.3
April ...	29.814	30.078	29.188	72.8	30.0	42.8	61.5	42.1	19.4	51.8	...	...	54.2	51.6
May ...	29.993	30.272	29.707	85.0	33.0	52.0	67.7	42.8	24.9	56.2	...	...	56.9	54.1
June ...	29.893	30.859	29.476	76.0	41.8	34.2	68.6	48.0	20.6	56.3	...	...	60.3	56.7
July ...	29.807	30.216	28.750	93.6	43.5	50.1	74.1	52.0	22.1	63.0	...	...	65.3	62.0
August ...	29.821	30.387	29.264	91.5	49.0	42.5	78.7	55.1	23.6	66.9	...	...	70.4	67.7
September ...	29.526	29.549	28.873	82.5	43.0	39.5	71.2	50.3	20.9	60.7	...	...	68.2	65.6
October ...	29.622	30.170	29.073	69.0	38.8	30.2	62.6	45.1	17.5	53.8	...	...	57.4	54.4
November ...	29.590	30.062	29.183	63.5	28.5	35.0	50.0	33.9	16.1	41.9	...	...	44.8	41.8
December ...	29.806	30.533	29.185	55.0	20.6	34.4	46.9	31.1	15.8	39.0	...	...	42.9	40.7
Yearly Sums, Means, and Totals ...	29.810	30.264	29.256	72.1	34.3	37.8	61.1	42.1	19.0	51.6	...	...	54.3	51.3

NETLEY.

Lat. 50° 5' N.

January ...	29.788	30.188	28.886	49.5	13.8	35.7	39.2	29.6	9.6	34.4	49.2	27.7	35.7	35.0
February ...	29.986	30.436	29.194	66.8	25.8	31.0	49.0	36.9	12.1	42.9	70.8	34.9	44.6	43.6
March ...	29.960	30.406	29.032	65.0	29.0	36.0	55.4	37.1	18.3	46.2	82.3	34.7	48.9	45.9
April ...	29.794	30.146	29.157	63.4	31.8	31.6	59.0	41.6	17.4	50.3	98.4	39.2	51.1	49.6
May ...	30.037	30.281	29.758	74.0	33.0	41.0	64.8	41.9	22.9	53.3	109.3	39.4	57.7	52.6
June ...	29.898	30.228	29.621	74.0	33.0	41.0	66.7	46.2	20.5	56.4	101.0	44.7	60.0	54.6
July ...	29.809	30.203	29.952	77.0	44.2	32.8	70.9	53.3	17.6	62.1	109.4	52.2	64.1	59.5
August ...	29.875	30.425	29.351	87.0	43.5	43.5	75.8	52.9	22.9	64.3	116.0	50.4	70.6	64.0
September ...	29.823	30.172	29.436	80.8	34.0	46.8	67.1	48.4	18.7	57.7	103.4	47.4	61.3	58.3
October ...	29.897	30.412	29.114	65.8	32.0	33.8	59.9	42.0	17.9	50.9	90.6	41.1	54.6	51.6
November ...	29.924	30.371	29.444	64.2	19.0	35.2	46.5	32.2	14.3	39.3	73.0	33.0	42.2	39.3
December ...	30.060	30.446	29.301	51.2	19.5	31.7	44.5	31.0	13.5	37.7	63.1	28.9	39.5	37.7
Yearly Sums, Means, and Totals ...	29.826	30.310	29.267	66.6	29.5	36.7	58.2	41.1	17.1	49.6	89.7	39.5	52.5	49.2

No. XVI—continued.

Long. 2° 40' W. Height above Sea 248 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition)						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pre- sure of Wind.	Mean daily Hori- zontal Movement of the Air.				On the Ground.	Feet above the Ground.
											lbs. per sq. foot	Miles				Inches	Inches
34.7	.202	2.3	0.5	84.8	548.8	11.00	3.00	11.00	6.00	0.00	...	456.6	6.3	4.8	15	3.22	...
42.5	.283	3.2	0.4	90.9	545.0	2.50	2.75	12.75	10.00	0.00	...	433.2	5.9	5.1	20	1.60	...
43.3	.290	3.2	0.6	82.5	542.4	4.75	9.25	10.50	6.50	0.00	...	364.6	4.6	5.2	9	0.90	...
48.3	.339	3.8	0.6	85.8	534.5	2.25	5.50	7.25	15.00	0.00	...	405.9	5.3	5.0	16	3.20	...
48.9	.349	3.9	1.1	76.9	534.2	7.75	13.75	2.50	7.00	0.00	...	317.7	3.8	4.5	4	0.66	...
52.1	.390	4.3	1.0	82.2	530.4	9.00	7.25	4.50	9.25	0.00	...	343.7	5.3	4.5	13	2.07	...
56.7	.480	5.1	1.3	79.6	523.9	3.50	2.00	6.25	19.25	0.00	...	377.2	5.1	4.2	16	3.62	...
60.1	.519	5.7	1.6	79.0	521.9	6.75	7.50	8.25	8.50	0.00	...	256.5	4.4	4.4	8	1.20	...
55.8	.446	4.9	1.1	82.4	524.6	6.25	12.00	6.00	5.75	0.00	...	407.1	5.6	5.1	16	4.35	...
49.1	.351	3.9	1.0	80.2	533.0	4.75	4.75	13.25	8.25	0.00	...	372.2	6.0	4.8	15	5.11	...
39.4	.241	2.8	0.6	80.8	544.6	8.75	12.50	6.25	2.50	0.00	...	448.9	6.9	4.5	14	1.53	...
38.0	.229	2.6	0.6	80.5	549.9	8.25	4.75	7.00	11.00	0.00	...	418.6	6.6	6.4	19	2.39	...
47.8	.341	3.8	8.6	82.1	536.0	75.00	85.00	95.00	109.00	0.00	...	393.5	5.5	4.9	175	29.85	...

Long. 2° 6' W. Height above Sea feet.

34.0	.195	2.3	0.4	85.4	554.2	7.00	7.25	8.75	8.00	0.00	...	...	6.3	5.6	22	3.44	...
42.2	.269	3.0	0.4	88.5	549.9	1.50	5.75	8.50	12.25	0.00	...	...	6.6	7.2	19	1.56	...
43.0	.278	3.1	0.9	78.9	546.4	4.75	11.00	8.25	7.00	0.00	...	...	4.7	5.7	11	0.84	...
49.1	.347	4.0	0.8	82.4	536.6	2.25	6.75	6.75	14.25	0.00	...	...	5.8	6.6	18	2.99	...
49.8	.358	4.0	1.6	82.0	534.8	5.25	16.50	2.25	7.00	0.00	...	...	3.3	5.8	5	1.49	...
53.6	.411	4.6	1.3	78.7	531.3	7.00	8.50	6.25	8.25	0.00	...	...	5.1	4.3	16	2.94	...
59.3	.506	5.5	1.3	81.5	524.1	0.25	7.75	2.75	19.75	0.50	...	...	6.2	6.9	13	6.38	...
56.7	.433	6.9	1.2	84.5	520.4	4.00	10.75	5.00	10.75	0.50	...	...	4.2	5.2	6	2.23	...
56.6	.459	5.1	1.4	79.2	521.7	6.00	13.00	3.50	7.50	0.00	...	...	5.7	6.2	16	7.04	...
51.7	.384	4.3	1.0	81.4	529.7	3.75	11.75	8.50	7.00	0.00	...	...	5.3	6.2	2	3.35	...
38.3	.232	2.7	0.7	77.8	543.4	4.75	18.25	3.00	4.00	0.00	...	...	6.4	5.2	10	1.30	...
38.1	.230	2.6	0.5	83.6	549.3	8.00	4.50	10.50	6.00	2.00	...	...	6.3	5.8	10	2.17	...
48.4	.358	4.0	9.2	81.2	536.7	54.50	121.75	74.00	111.75	3.00	...	...	5.5	5.9	168	35.73	...

Long. 1° 20' W. Height above Sea 47 feet.

33.9	.198	2.3	0.2	93.0	556.9	9.75	7.25	7.25	6.75	0.00	...	211.0	9.0	3.5	14	2.55	1.99
42.3	.272	3.1	0.2	92.6	550.6	6.00	3.25	8.25	10.50	0.00	...	256.0	4.0	7.5	14	1.45	1.11
42.7	.276	3.2	0.8	79.9	545.5	7.25	5.25	9.75	8.75	0.00	...	272.0	5.0	3.5	5	1.01	0.72
48.1	.337	3.8	0.4	89.6	539.5	4.00	4.50	9.50	12.00	0.00	...	298.7	8.0	5.2	14	4.56	3.38
48.0	.335	3.7	1.6	70.2	537.1	9.50	7.00	8.25	6.25	0.00	...	183.0	7.0	5.0	5	0.66	0.47
49.8	.359	4.0	1.8	69.0	531.9	8.75	5.25	6.50	9.50	0.00	...	177.0	7.5	5.0	13	2.38	1.86
55.7	.448	4.9	1.7	74.1	528.9	3.25	1.00	13.25	13.50	0.00	...	289.0	7.0	4.0	16	6.93	6.29
59.0	.501	5.4	2.7	67.0	522.0	4.50	4.50	12.00	10.00	0.00	...	176.0	5.5	4.0	4	1.43	1.25
52.9	.401	4.5	1.6	74.5	529.2	10.50	6.00	5.75	7.75	0.00	...	188.0	7.0	3.5	11	4.91	4.10
48.4	.344	3.9	0.9	80.6	537.7	6.00	5.50	8.25	11.25	0.00	...	158.9	6.0	4.3	12	2.23	1.63
35.7	.210	2.4	0.7	78.7	552.7	15.25	2.50	2.25	5.00	0.00	...	155.0	5.0	3.0	7	0.78	0.55
38.4	.207	2.4	0.5	85.6	558.0	11.25	7.75	4.75	12.25	0.00	...	189.0	7.0	4.0	10	2.45	1.80
46.0	.322	3.6	1.1	79.6	540.6	96.00	59.75	95.75	113.50	0.00	...	211.1	6.5	4.2	125	31.24	25.00

Appendix

PARKHURST, ISLE OF WIGHT.

Lat. 50° 45' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygro meter	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	48.0	16.0	32.0	39.2	27.1	12.1	33.1	49.3	25.3	35.2	34.2
February	60.6	23.0	37.0	49.4	34.9	14.5	42.1	70.2	32.9	45.0	41.0
March	67.0	26.0	41.0	53.7	34.3	19.4	44.0	86.7	30.7	48.0	45.1
April	68.0	30.0	38.0	58.2	39.0	19.2	48.6	102.3	36.0	52.3	48.3
May	75.0	32.0	43.0	64.7	39.7	25.0	52.2	109.4	35.9	57.3	51.2
June	75.0	36.0	39.0	66.1	44.8	21.3	55.5	112.9	42.0	59.7	57.0
July	84.0	42.0	42.0	70.1	50.4	19.7	60.2	123.0	49.0	64.4	60.4
August	89.0	44.0	45.0	75.8	51.0	24.8	63.4	120.7	49.5	69.2	61.5
September	80.0	36.0	44.0	67.0	47.7	19.3	57.3	101.4	45.5	60.7	56.9
October	67.0	34.0	33.0	60.7	40.7	20.0	50.7	83.2	37.0	54.0	51.3
November	65.0	22.0	43.0	49.1	33.5	15.6	41.3	57.7	30.8	41.2	38.4
December	57.0	21.0	36.0	49.3	30.8	18.5	40.0	56.1	29.2	39.4	36.7
Yearly Sum, Means, and Totals	60.6	30.2	39.4	58.6	39.5	19.1	49.0	89.4	37.0	51.4	49.9

PORTSMOUTH.

Lat. 50° 45' N.

January ...	29.821	50.260	28.042	49.2	19.2	29.0	41.4	28.4	13.0	34.9	48.5	22.8	36.7	33.1
February ...	30.029	30.482	29.204	57.2	24.2	33.0	52.0	35.5	16.5	43.7	67.6	28.7	45.0	42.2
March ...	30.066	30.141	29.261	67.0	29.0	38.0	58.9	36.7	19.2	46.3	82.5	30.6	44.5	48.6
April ...	29.822	30.155	29.210	65.4	30.0	35.4	60.0	41.5	18.5	50.7	91.2	36.8	52.8	48.4
May ...	30.069	30.355	29.800	78.4	36.2	42.2	68.2	42.0	26.2	55.1	109.5	36.3	58.0	51.6
June ...	29.823	30.220	29.533	74.2	35.2	39.0	69.5	46.4	22.1	59.4	114.6	41.3	59.8	54.3
July ...	29.890	30.475	28.482	81.4	47.2	34.0	72.5	53.1	19.4	62.8	119.7	49.5	65.0	59.5
August ...	30.036	30.475	29.311	86.2	47.2	39.0	77.4	54.8	22.6	66.1	119.4	49.1	70.0	63.4
September ...	29.386	30.231	29.093	78.2	35.2	43.0	67.5	49.0	18.5	58.2	99.8	44.6	62.4	56.4
October ...	29.956	30.474	29.188	68.8	36.2	32.6	59.8	44.0	15.8	51.9	79.5	40.5	53.1	50.9
November ...	29.983	30.443	29.489	55.8	25.4	30.4	46.6	32.8	13.8	39.7	54.0	29.8	42.3	38.9
December ...	30.127	30.538	29.398	50.6	21.2	29.4	44.5	31.8	12.7	38.1	50.5	28.6	40.6	38.5
Yearly Sum, Means, and Totals ...	29.976	30.390	29.242	67.6	32.2	35.4	59.5	41.3	18.2	50.4	86.4	36.5	52.6	49.0

SHEERNESS.

Lat. 31° 29' N.

January ...	...	...	...	46.8	11.5	35.3	38.1	25.8	12.3	31.9	...	...	34.1	32.1
February ...	...	...	...	56.5	13.0	43.5	48.1	30.9	17.2	39.5	...	...	43.5	41.3
March ...	...	...	...	67.0	21.0	46.0	54.8	30.9	23.9	42.8	...	...	45.9	43.6
April ...	...	...	...	67.0	28.0	39.0	57.4	36.9	20.5	47.1	...	...	50.9	48.0
May ...	...	...	...	80.0	30.5	49.5	62.4	39.5	22.9	50.9	...	...	54.1	51.4
June ...	...	...	...	72.5	35.0	37.5	64.2	44.6	19.6	54.4	...	...	57.6	55.1
July ...	...	...	...	80.5	41.5	39.0	72.0	49.2	22.8	60.6	...	...	65.9	62.4
August ...	...	...	...	81.0	45.5	35.5	73.6	51.2	22.1	62.4	...	...	68.8	65.6
September ...	...	...	...	77.5	35.0	42.5	66.2	47.3	19.9	56.7	...	...	61.1	59.3
October ...	...	...	...	68.0	31.0	37.0	60.1	38.5	21.6	49.3	...	...	52.8	51.6
November ...	...	...	...	62.5	22.0	40.5	45.0	29.7	15.3	37.3	...	...	...	...
December ...	...	...	...	50.0	11.5	38.5	42.7	29.1	13.6	35.9	...	...	...	...
Yearly Sum, Means, and Totals ...	...	...	...	67.4	27.1	40.3	57.0	37.8	19.2	47.4	...	...	...	...

* Incorrect and useless.

No. XVI—continued.

Long. 1° 16' W. Height above Sea 200 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pre- sure of Wind.	Mean daily Hor- izontal Movement of the Air.				On the Ground.	Feet above the Ground.
33.0	.192	2.2	0.3	90.9	...	7.00	8.00	7.50	8.50	0.00	lbs. per sq. foot	Miles	7.7	6.1	7	2.60	...
42.8	.275	3.1	0.3	92.0	...	3.00	3.00	10.50	11.50	0.00	...	...	7.5	6.4	10	2.00	...
42.1	.267	3.1	0.7	80.4	...	5.25	8.50	8.75	8.50	0.00	...	...	6.2	5.2	8	1.32	...
46.3	.314	3.6	0.9	80.3	...	3.25	6.50	10.25	10.00	0.00	...	...	7.1	5.7	16	4.55	...
49.4	.355	3.9	1.3	74.7	...	4.75	14.00	4.75	7.50	0.00	...	...	5.7	4.9	4	0.34	...
54.6	.427	4.3	1.0	83.8	...	5.75	10.00	7.25	7.00	0.00	...	...	8.4	6.6	14	2.62	...
57.8	.480	5.3	1.4	79.0	...	2.25	0.75	7.00	20.50	0.50	...	...	7.0	6.0	16	3.98	...
60.2	.532	5.9	2.0	74.7	...	4.00	10.75	8.00	8.25	0.00	...	...	4.0	5.5	4	1.67	...
53.6	.413	4.6	1.3	77.9	...	6.00	11.00	3.50	9.00	0.50	...	...	6.4	5.6	16	7.55	...
48.7	.342	3.4	0.8	81.8	...	5.25	6.50	10.50	8.75	0.00	...	...	8.7	6.6	8	1.74	...
35.1	.205	2.4	0.6	79.5	...	6.75	11.25	3.25	5.75	3.00	...	...	6.4	5.8	5	1.22	...
33.2	.180	2.2	0.6	79.1	...	11.00	13.25	1.00	5.75	0.00	...	...	3.5	4.5	7	2.09	...
46.6	.316	3.7	0.9	81.2	...	64.25	103.50	82.25	111.00	4.00	...	...	6.5	3.7	115	31.98	...

Long. 1° 5' W. Height above Sea feet.

																		†
32.8	.187	2.2	0.4	86.8	556.8	10.25	5.00	8.00	4.25	3.50	...	172.6	8.4	2.0	14	2.59	2.41	
38.9	.237	2.7	0.7	79.4	551.1	3.00	4.75	10.50	8.75	1.00	...	174.3	7.6	1.5	16	0.99	0.86	
40.1	.258	2.8	1.1	72.4	548.9	6.00	9.25	8.50	7.25	0.00	...	170.8	4.7	1.6	8	0.63	0.79	
44.0	.298	3.3	1.3	72.4	558.8	2.00	7.50	7.25	13.25	0.00	...	368.7	6.6	1.8	16	3.27	3.20	
45.8	.309	3.5	1.9	64.0	537.6	8.25	9.25	5.50	8.00	0.00	...	136.1	3.2	1.5	2	0.14	0.14	
49.4	.354	3.9	1.8	68.5	532.8	12.00	4.00	7.25	6.75	0.00	...	141.9	5.8	1.3	12	2.64	2.60	
55.0	.432	4.7	2.1	70.5	526.6	2.25	2.50	12.25	14.00	0.00	...	175.9	5.1	2.0	14	2.31	2.29	
58.3	.489	5.3	2.7	66.6	523.6	2.50	11.00	11.25	6.25	0.00	...	156.5	3.2	2.3	3	0.90	0.86	
51.6	.383	4.2	2.0	69.0	529.6	8.50	10.75	6.00	4.75	0.00	...	146.7	6.1	2.2	15	4.99	4.64	
46.9	.322	3.7	1.2	74.0	537.5	4.00	7.50	11.50	8.00	0.00	...	113.4	6.7	1.9	15	1.94	1.78	
34.7	.203	2.3	0.3	75.6	553.5	9.75	7.75	3.00	9.50	0.00	...	129.5	5.8	0.7	8	1.24	1.17	
35.8	.210	2.4	0.5	83.8	558.0	8.25	2.00	8.00	12.75	0.00	...	117.9	6.6	1.7	12	1.73	1.56	
44.4	.306	3.4	1.3	73.5	541.1	76.25	81.25	99.00	103.50	4.50	...	166.6	5.8	1.7	137	23.57	22.31	

Long. 0° 69' E. Below Sea 2 feet.

28.6	.157	1.8	0.5	79.3	...	6.50	7.75	9.25	7.50	...	...	...	7.4	3.0	12	1.68	...
38.7	.235	2.7	0.6	82.1	...	4.00	6.00	9.25	8.75	...	...	...	8.0	3.4	7	0.86	...
41.0	.259	2.9	0.6	83.8	...	7.00	7.50	4.50	12.00	...	...	...	5.7	4.3	7	0.51	...
45.0	.299	3.4	0.8	80.6	...	5.75	5.25	6.00	13.00	...	...	...	6.6	5.0	12	1.74	...
49.8	.343	3.9	0.8	81.8	...	12.75	6.00	3.25	9.00	...	...	...	4.4	4.7	7	0.75	...
52.8	.397	4.4	0.9	82.0	...	9.25	7.75	3.50	9.50	...	...	...	7.5	4.7	12	2.08	...
59.5	.511	5.6	1.4	80.5	...	1.75	3.00	11.50	14.75	...	...	...	5.8	4.3	12	2.25	...
63.2	.578	6.3	1.5	82.0	...	9.75	5.25	5.75	10.25	...	...	...	4.1	3.9	5	1.24	...
58.7	.495	5.5	0.4	92.2	...	12.00	7.25	2.75	8.00	...	...	...	6.7	3.9	13	3.24	...
50.4	.387	4.1	0.4	92.4	...	3.25	4.75	11.75	11.25	...	...	...	6.1	3.1	11	1.05	...
*	*	*	*	*	...	11.75	5.00	4.25	9.00	...	...	...	6.1	2.4	8	0.49	...
*	*	*	*	*	...	5.50	0.75	7.00	17.75	...	...	...	6.8	3.7	13	0.96	...
...	...	...	...	...	...	89.25	66.25	78.75	180.75	...	...	...	6.3	3.9	119	16.85	...

* Incorrect and useless.

† 20 feet above

Appendix

SHORNCLIFFE CAMP.

Lat. 51° 5' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate temperature.			Dry Bulb.	Wet Bulb.
January
February
March
April
May
June
July
August
September
October
November
December
Yearly Sums, Means, and Totals

WOOLWICH.

Lat. 51° 29' N.

January ...	29.557	29.987	28.646	45.5	18.0	27.5	37.3	28.3	9.0	32.8	43.4	26.7	34.0	33.0
February ...	29.740	30.175	28.998	55.9	24.4	31.5	47.9	36.5	11.4	42.2	69.5	33.5	43.7	41.6
March ...	29.796	30.240	29.042	69.9	26.4	43.5	54.2	36.4	17.8	48.8	90.7	33.7	48.8	43.9
April ...	29.650	29.966	28.943	65.2	29.4	35.8	56.8	40.8	16.0	48.8	96.3	39.0	51.2	47.2
May ...	29.624	30.133	28.580	77.0	32.0	45.0	63.6	40.7	22.9	53.1	111.6	39.4	57.2	50.6
June ...	29.677	29.998	29.305	78.8	37.0	39.8	65.6	46.8	18.8	56.2	109.9	44.9	58.6	54.2
July ...	29.609	29.980	29.157	80.2	48.0	37.2	71.4	52.5	18.9	61.9	121.4	51.6	68.3	60.1
August ...	29.784	30.000	28.938	89.8	43.5	45.8	77.4	52.5	24.9	64.9	125.5	52.4	70.3	63.5
September ...	29.651	30.019	28.902	82.1	43.8	39.3	66.8	50.4	16.4	58.6	105.4	51.4	60.2	56.3
October ...	29.716	30.245	28.902	68.0	29.5	38.5	58.5	40.4	18.1	48.4	88.4	36.8	52.3	60.1
November ...	29.737	30.208	29.210	56.0	20.0	36.0	44.5	30.8	13.7	37.6	66.9	29.6	36.4	37.0
December ...	29.867	30.270	29.172	49.0	14.8	34.2	42.3	31.4	10.9	36.8	45.3	30.4	38.8	37.7
Yearly Sums, Means, and Totals ...	29.709	30.102	29.090	67.9	30.1	37.8	57.2	40.6	16.6	48.9	88.4	39.2	51.7	49.6

EDINBURGH.

Lat. 55° 57' N.

January ...	29.239	29.825	27.996	47.0	22.5	24.5	37.5	28.5	9.0	33.0	40.0	26.1	35.2	33.5
February ...	29.361	29.727	28.864	52.0	27.0	25.0	45.0	36.5	8.5	40.7	56.6	34.7	42.7	40.4
March ...	29.418	30.042	28.767	61.0	28.5	32.5	49.6	36.8	12.8	43.2	74.6	34.0	45.7	41.6
April ...	29.284	29.703	28.643	58.2	31.5	26.7	48.6	36.4	12.2	42.5	70.1	34.1	45.0	41.4
May ...	29.569	29.961	29.135	73.8	29.0	44.8	60.3	42.8	17.5	51.5	97.7	39.8	55.2	49.1
June ...	29.478	29.808	28.992	70.7	39.5	31.2	61.5	46.2	15.3	53.8	97.9	43.6	56.5	51.1
July ...	29.218	29.511	28.716	72.0	46.0	26.0	67.4	50.8	16.6	59.1	107.4	48.8	61.9	56.2
August ...	29.445	29.930	28.624	80.0	46.0	34.0	68.3	52.5	15.8	60.4	101.6	49.6	64.0	57.6
September ...	29.439	29.911	28.948	68.0	38.0	30.0	58.1	47.5	10.6	52.8	83.7	45.2	54.9	50.7
October ...	29.344	29.843	28.618	64.0	31.0	33.0	52.9	42.1	10.8	47.5	68.7	40.6	50.3	47.0
November ...	29.514	29.815	29.872	51.2	26.0	25.2	43.5	34.0	9.5	38.7	52.6	38.1	40.3	37.8
December ...	29.710	29.873	28.667	53.0	24.0	29.0	43.4	32.6	10.8	38.0	45.2	31.3	39.5	37.2
Sums, Means, and Totals ...	29.335	29.821	28.819	62.6	32.4	30.2	53.0	40.6	12.4	46.8	74.7	38.4	49.2	45.3

No. XVI—continued.

Long. 1° 10' E. Height above Sea 220 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).							Atmospherical Conditions.									
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.	Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean degree of Humidity.		North.	East.	South.	West.						On the Ground.	20 Feet above the Ground.
...
40.5	.252	2.8	0.6	82.8	547.9	5.50	8.00	8.00	9.00	0.50	...	...	...	...	...	...
44.4	.293	3.3	0.6	85.8	539.9	4.25	6.00	5.00	14.75	0.00	...	...	...	...	...	...
49.6	.355	4.0	0.5	87.6	539.1	13.50	3.00	6.75	7.75	0.00	...	...	...	...	...	...
51.7	.368	4.3	0.7	85.8	533.4	8.75	1.75	7.50	10.50	1.50	...	...	...	...	...	...
56.7	.459	5.0	1.1	83.2	526.2	1.00	4.25	5.75	20.00	0.00	...	...	...	...	...	...
58.4	.490	5.4	2.2	70.0	522.0	5.75	10.00	6.75	8.50	0.00	...	...	...	...	...	...
52.6	.395	4.4	1.4	76.0	528.6	10.50	10.25	3.75	5.50	0.00	...	...	...	...	...	...
47.8	.332	3.7	0.8	81.8	538.1	12.00	6.75	3.50	8.75	0.00	...	...	...	...	...	...
36.6	.217	2.5	0.3	88.8	552.8	9.75	12.25	2.00	5.00	1.00	...	...	...	...	...	...
35.7	.209	2.4	0.3	90.2	556.8	9.75	2.75	3.50	14.00	1.00	...	...	...	...	...	...
47.4	.339	3.7	0.8	83.1	538.4	80.75	65.00	52.50	103.75	4.00	...	...	...	...	...	...

Long. 0° 4' E. Height above Sea 145 feet.

31.2	.176	2.1	0.2	89.0	554.9	5.50	10.25	10.00	5.25	0.00	...	102.0	8.0	4.0	8	1.39	1.31
39.1	.240	2.7	0.6	83.9	547.2	1.50	5.25	9.50	10.75	1.00	...	176.0	9.0	6.0	9	0.81	0.77
39.1	.239	2.7	1.1	70.9	544.4	4.00	9.00	6.25	9.75	2.00	...	142.0	6.0	6.0	9	0.68	0.60
43.0	.279	3.1	1.1	74.2	536.8	1.00	7.25	9.25	11.50	1.00	...	152.0	8.0	6.0	17	2.39	2.30
44.6	.294	3.1	1.9	62.6	534.0	6.75	9.25	5.25	8.75	1.00	...	98.0	6.0	6.0	5	0.76	0.74
50.2	.364	4.1	1.4	74.0	529.6	9.50	6.50	6.00	7.00	1.00	...	96.0	8.0	5.0	13	2.46	2.39
56.8	.446	4.9	1.9	72.0	521.1	2.50	1.50	12.00	15.00	0.00	...	188.0	7.0	6.0	14	1.79	1.40
58.3	.488	5.3	2.8	65.8	519.0	2.00	10.75	10.25	7.50	0.50	...	*	5.0	5.0	4	0.74	*
52.9	.401	4.5	1.4	76.8	527.3	6.75	14.00	3.75	5.50	0.00	...	*	6.4	5.4	11	3.53	*
47.9	.334	3.8	0.7	84.9	537.1	2.75	16.00	4.50	7.75	0.00	...	*	5.8	4.9	10	1.37	*
35.1	.204	2.4	0.4	88.2	563.3	7.75	11.75	0.75	9.75	0.00	...	79.1	6.0	4.9	7	0.46	0.40
36.2	.215	2.5	0.2	91.7	554.9	6.75	0.75	7.75	15.75	0.00	...	148.9	6.4	5.5	12	1.30	1.10
44.4	.306	3.4	1.1	77.8	538.2	66.75	102.25	85.25	114.25	6.50	...	...	6.8	5.4	119	17.67	...

Long. 3° 11' W. Height above Sea 402 feet.

30.8	.172	2.0	0.4	83.6	547.8	9.00	4.00	1.00	10.00	7.00	...	180.5	4.4	1.7	5	0.91	†
37.6	.226	2.6	0.6	82.9	541.4	2.25	3.25	3.00	15.00	4.50	...	253.6	7.2	3.1	12	2.31	2.18
36.9	.220	2.5	1.0	72.1	539.3	7.75	3.75	2.25	15.25	2.00	...	234.5	4.6	3.5	6	0.81	0.74
37.2	.222	2.6	0.8	74.4	537.7	9.75	10.75	3.25	4.25	2.00	...	231.8	7.8	3.1	17	4.59	3.66
43.2	.281	3.1	1.8	64.7	531.6	5.75	11.25	0.50	10.50	3.00	...	177.3	4.5	3.5	7	0.75	0.72
46.1	.313	3.5	1.6	68.0	528.6	5.00	15.75	1.50	5.75	2.00	...	183.2	7.0	3.4	16	2.39	2.27
51.3	.378	4.2	2.0	68.5	517.9	2.00	0.60	2.25	21.25	5.00	...	150.3	6.4	2.4	22	2.74	2.63
52.3	.392	4.4	2.2	65.4	519.8	3.50	3.00	3.75	18.25	3.00	...	165.1	5.7	2.5	8	1.93	1.84
46.7	.319	3.6	1.3	73.7	529.3	5.75	12.75	1.00	9.00	1.00	...	191.4	6.3	2.6	14	2.40	1.96
43.5	.283	3.3	0.9	78.2	532.7	2.00	6.00	1.00	16.00	6.00	...	172.9	6.4	1.2	19	2.35	2.00
34.6	.201	2.3	0.6	80.6	547.1	9.75	7.50	1.00	6.75	5.00	...	236.3	6.7	2.0	15	3.27	2.79
34.2	.198	2.3	0.6	81.6	546.4	6.00	1.25	2.00	18.25	3.50	...	239.3	5.8	1.9	11	1.75	1.61
41.4	.267	3.0	1.1	74.5	535.8	68.50	79.75	22.00	150.25	44.50	...	201.3	6.0	2.6	152	26.18	23.12

* Ladder broken.

† 120 feet above the ground.

Appendix

Abstract of Results of Meteorological Observations

Stations, with their Height above the Sea.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and cor- rected to 32°.	Lowest reduced and cor- rected to 32°.	Highest during Year.	Lowest during Year.	Range during Year.	Mean.				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
Aldershot ... 325 ft.	29.596	30.113	28.542	90.0	17.0	73.0	57.7	41.3	16.4	49.5	91.7	38.2	51.5	47.7
Canterbury ... 80 "	...	...	...	88.0	4.0	84.0	58.4	37.6	20.8	48.0	...	...	52.3	50.2
Chatham ... 160 "	29.810	30.466	28.767	85.8	13.7	72.1	58.8	38.5	20.3	48.6	89.7	36.0	51.6	50.0
Colchester ... 109 "	29.826	30.448	28.783	87.6	10.2	77.4	59.5	38.1	21.4	48.4	88.4	34.4	55.8	48.4
Devonport ... 35 "	29.735	30.349	28.625	83.8	13.8	70.0	60.1	40.2	19.9	50.2	96.0	33.6	54.3	50.4
Dover ... 325 "	...	...	...	85.0	12.0	73.0	54.7	38.3	16.4	46.5	...	...	50.7	47.8
Guernsey ... 248 "	29.699	30.287	28.694	92.1	27.2	64.9	58.4	45.2	13.2	51.8	97.0	39.9	52.9	50.2
Jersey ... 72.5 "	29.810	30.859	28.750	93.6	20.6	73.0	61.1	42.1	19.0	51.6	...	...	54.3	51.3
Netley ... 47 "	29.825	30.446	28.685	87.0	13.8	73.2	58.2	41.1	17.1	49.6	89.7	39.5	52.5	49.2
Parkhurst ... 200 "	...	...	...	89.0	16.0	73.0	58.6	39.5	19.1	49.0	89.4	37.0	51.4	48.9
Portsmouth ... 20 "	29.976	30.538	29.242	86.2	19.2	67.0	59.5	41.3	18.2	50.4	86.4	36.5	52.6	49.0
Sheerness 2 ft. below	...	...	...	81.0	11.5	69.5	57.0	37.8	19.2	47.4	...	...	...	...
Shorncliffe ... 220 ft.	29.804	30.241	29.072	86.4	16.4	70.0	57.7	42.6	15.1	50.1	104.2	36.3	55.5	49.9
Woolwich ... 145 "	29.709	30.270	28.646	89.3	14.8	74.5	57.2	40.6	16.6	48.9	85.4	39.2	51.7	49.6
Edinburgh ... 402 "	29.335	29.930	27.996	80.0	22.5	57.5	53.0	40.6	12.4	46.8	74.7	38.4	49.2	45.3

No. XVI—continued.

taken at Stations in England and Scotland in the year 1871.

Hygrometrical Results from Glaisher's Tables (3rd edition).										Atmospherical Conditions.									
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Rain fall on the Ground.	Latitude.	Longitude.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hor- izontal Movement of the Air.							
44.1	.802	3.1	1.2	76.9	.536.0	84.00	69.00	96.00	116.00	...	lbs. per sq. foot	Miles	7.7	2.4	167	27.92	51 15 N.	0 45 W	
48.2	.860	3.1	0.7	79.0	...	87.25	68.00	76.00	114.25	19.50	...	...	5.0	3.1	138	20.30	51 17 ,,	1 5 E.
48.5	.857	4.0	0.5	89.7	.538.5	58.50	76.25	109.50	108.25	12.50	...	206.6	5.7	2.9	153	22.92	51 23 ,,	0 32 ,,	
44.5	.806	3.4	1.3	75.9	.539.3	81.75	77.25	95.75	109.75	0.50	...	148.0	7.1	3.5	133	21.48	50 53 ,,	0 54 ,,	
47.3	.841	3.8	1.2	77.2	.535.4	60.00	109.75	91.00	99.75	4.50	...	211.8	7.2	4.5	175	40.92	50 17 ,,	4 5 W.	
44.8	.815	3.4	0.9	80.6	...	50.25	94.50	92.00	123.25	...	...	...	5.6	4.4	130	27.34	51 8 ,,	1 19 E.
47.3	.841	3.8	8.5	82.1	.536.0	75.00	85.00	95.00	109.00	...	...	323.5	5.5	4.9	175	29.85	49 33 ,,	2 4 W.
48.4	.858	4.0	9.2	81.2	.536.7	54.50	121.75	74.00	111.75	3.00	...	...	5.5	5.9	158	35.73	49 11 ,,	2 6 ,,
46.0	.822	3.6	1.1	79.6	.540.6	96.00	59.75	95.75	113.50	...	...	311.1	6.5	4.2	125	38.28	50 5 ,,	1 20 ,,
46.6	.816	3.7	0.9	81.2	...	64.25	103.50	82.25	111.00	4.00	...	...	6.5	5.7	115	31.98	50 45 ,,	1 16 ,,
44.4	.806	3.4	1.3	73.5	.541.1	76.25	81.25	99.00	103.50	4.50	...	166.6	5.8	1.7	137	23.57	50 45 ,,	1 5 ,,	
...	...	...	...	...	...	89.25	66.25	78.75	130.75	...	...	...	6.3	3.9	119	16.85	31 29 ,,	0 69 E.
47.4	.839	3.7	0.8	83.1	.538.4	80.75	65.00	52.50	103.75	4.00	...	347.8	5.0	4.0	116	7.42	51 5 ,,	1 10 ,,	
44.4	.806	3.4	1.1	77.8	.538.2	56.75	102.25	85.25	114.25	9.50	...	...	6.8	5.4	119	17.67	51 29 ,,	0 4 ,,
41.4	.267	3.0	1.1	74.5	.535.8	68.50	79.75	22.00	150.25	44.50	...	201.3	6.0	2.6	152	26.18	55 57 ,,	3 11 W.	

Appendix

Abstract of Results of Meteorological Observations

ATHLONE.

Lat. 53° 26' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	52.1	22.1	30.0	45.4	29.2	16.2	37.3	...	...	37.1	36.1
February	56.5	29.2	27.3	51.6	36.9	14.7	44.2	...	...	46.2	44.4
March	70.6	28.5	42.1	54.9	35.4	19.5	45.1	...	...	49.0	45.4
April	65.3	25.5	39.8	50.8	36.7	21.1	40.2	...	...	53.4	46.3
May	79.4	32.4	47.0	67.2	42.1	25.1	54.6	...	...	60.0	53.6
June	76.6	37.1	39.5	68.4	46.9	22.5	57.1	...	...	61.5	55.4
July	76.0	39.5	36.5	70.4	47.0	23.4	58.7	...	...	62.4	57.5
August	81.5	39.4	42.1	73.4	48.7	24.7	61.0	...	...	66.2	60.6
September	72.4	28.9	43.5	64.6	41.3	23.3	52.9	...	...	57.3	52.3
October	66.3†	27.8	38.5†	59.0†	37.0†	21.7†	48.7†	...	...	52.0†	48.0†
November
December	57.8	19.0	38.8	46.6	26.6	18.0	37.6	...	...	39.3	36.3
Yearly Sums, Means, and Totals	68.6	29.9	38.7	60.2	39.3	20.9	48.7	...	...	53.0	48.2

BELFAST.

Lat. 54° 36' N.

January ...	29.650	30.244	28.827	48.0	23.7	24.3	40.8	30.2	10.6	35.5	47.3	...	37.2	36.1
February ...	29.782	30.219	29.090	55.0	30.9	34.1	49.8	38.1	11.7	48.9	63.4	...	45.5	43.4
March ...	29.848	30.502	29.096	68.1	24.2	41.9	53.1	36.0	17.1	44.5	78.2	35.0	47.5	44.1
April ...	29.677	30.098	28.893	65.1	30.7	34.4	46.7	40.0	16.7	46.3	84.0	39.4	50.6	46.9
May ...	30.020	30.821	29.639	74.0	31.0	43.0	65.2	44.0	21.2	54.6	98.8	42.8	58.1	54.2
June ...	29.677	30.261	29.381	75.5	41.0	34.5	67.2	47.8	18.5	57.9	110.1	48.0	61.4	59.8
July ...	29.643	29.808	29.120	74.0	46.0	28.0	69.7	51.2	18.3	66.4	95.6	50.1	62.9	61.6
August ...	29.867	30.350	29.060	81.0	44.0	37.0	71.6	50.9	20.7	61.2	102.6	...	65.3	60.0
September ...	29.845	30.345	29.165	73.0	33.0	40.0	63.7	46.7	17.0	58.2	82.4	41.6	57.5	53.1
October ...	29.750	30.317	28.922	63.0	28.0	35.0	58.6	42.4	16.2	50.5	74.4	39.8	52.5	49.9
November ...	29.945	30.560	29.317	53.0	27.0	26.0	48.3	36.3	12.0	42.3	59.3	33.3	43.8	41.3
December ...	29.899	30.370	29.001	55.0	21.0	34.0	46.5	34.1	12.4	40.3	49.9	31.5	41.5	39.4
Yearly Sums, Means, and Totals ...	29.817	30.290	29.083	65.2	31.7	33.5	57.6	41.5	16.1	49.5	78.7	40.1	51.9	48.1

BUTTEVANT.

Lat. 52° 14' N.

January ...	...	...	...	52.0	16.0	36.0	44.5	28.9	15.6	36.7	...	...	38.8	37.6
February ...	...	...	...	64.0	28.0	36.0	52.2	36.6	15.6	44.4	...	...	47.0	45.5
March ...	...	...	...	66.0	23.0	43.0	54.3	34.6	19.7	44.4	...	...	49.1	45.2
April ...	...	...	...	67.0	25.0	42.0	58.3	39.4	19.4	49.1	...	...	53.0	49.8
May ...	...	...	...	79.0	27.0	52.0	66.0	40.5	26.3	53.6	...	...	59.8	54.3
June ...	...	...	...	79.0	35.0	44.0	67.0	48.0	21.0	56.5	...	...	60.7	57.0
July ...	...	...	...	75.0	38.0	37.0	69.1	46.4	22.7	57.7	...	...	62.3	59.6
August ...	...	...	...	81.0	42.0	39.0	71.3	49.2	22.6	60.5	...	...	65.3	61.3
September ...	...	...	...	74.0	25.0	49.0	64.6	38.7	25.9	51.6	...	...	57.2	54.5
October ...	...	...	...	66.0	24.0	42.0	58.7	39.1	19.6	48.9	...	...	52.5	50.6
November ...	...	...	...	57.0	16.0	41.0	48.6	31.9	16.7	40.2	...	...	43.3	41.8
December ...	...	...	...	58.0	12.0	46.0	46.3	28.0	18.3	37.1	...	...	39.8	38.7
Yearly Sums, Means, and Totals ...	...	...	...	68.2	26.0	42.2	58.6	38.3	20.3	48.5	...	...	52.3	49.7

* May—29 days only.

† October—28 days only.

‡ Too imperfect to be of use.

§ Out of order.

No. XVI—continued.

taken at Stations in Ireland in the year 1871.

Long. 8° 0' W. Height above Sea 304 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.		In a Cubic Foot of Air.		Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
	Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.	Mean Weight of Cubic Foot of Air.		North.	East.	South.	West.		Mean daily pressure of Wind.	Mean daily Horizontal Movement of the Air.				On the Ground.	30 Feet above the Ground.
34.7	.201	2.3	0.3	91.1	...	7.00	2.75	8.00	13.25	...	...	...	7.0	3.9	26	3.58	...
42.4	.271	3.1	0.5	87.4	...	1.25	5.00	8.50	13.25	...	...	...	6.5	4.5	20	3.53	...
41.5	.263	3.0	1.0	75.4	...	3.50	6.25	11.75	9.50	...	...	...	5.8	4.9	17	2.32	...
44.2	.291	2.9	1.3	71.0	...	5.00	7.50	9.50	8.00	...	...	...	7.1	4.7	19	3.00	...
47.9	.335	3.7	2.1	64.4	...	8.25	11.00	3.50	9.25	1.00	...	...	5.5	5.4	14	1.45	...
50.2	.362	4.1	2.0	67.0	...	6.75	10.50	1.75	9.50	2.00	...	...	5.2	4.2	22	4.40	...
53.3	.408	4.5	1.8	72.5	...	2.50	0.25	8.00	20.25	...	...	...	5.3	5.1	30	7.03	...
54.8	.430	4.7	2.1	69.7	...	5.00	3.25	10.50	12.25	...	...	...	7.3	3.8	19	2.91	...
48.7	.343	3.8	1.4	72.8	...	12.00	9.00	4.50	4.50	...	...	...	7.7	3.8	12	1.35	...
46.6*	.318*	3.6*	0.9*	80.6*	...	4.50	3.75	9.75	13.00	...	...	...	5.5	4.5	24	3.02	...
†	†	†	†	†	...	8.75	6.75	6.00	8.50	...	...	...	6.0	4.2	7	1.78	...
34.7	.202	2.3	0.4	87.6	...	3.50	1.75	12.75	13.00	...	...	...	5.8	5.0	12	3.70	...
45.4	.311	3.2	1.3	76.3	...	66.00	67.75	94.50	133.75	3.00	...	...	7.0	4.6	216	38.07	...

Long. 5° 57' W. Height above Sea 50 feet.

34.6	.200	2.3	0.3	90.3	552.9	6.50	2.50	11.00	8.00	3.00	...	68.9	1.9	0.3	17	3.34	3.11
41.0	.257	2.9	0.6	84.8	546.0	2.00	3.50	10.50	10.00	2.00	...	105.2	3.1	0.9	17	3.71	3.48
40.3	.250	2.9	0.9	76.7	544.9	2.50	2.50	13.50	8.50	4.00	...	105.7	3.6	1.1	12	1.42	1.31
42.0	.278	3.2	0.9	78.4	538.4	7.00	8.00	8.50	6.50	0.00	...	56.4	4.1	1.3	16	3.68	3.44
50.7	.371	4.1	1.3	76.5	536.2	10.50	4.00	4.50	9.00	3.00	...	63.2	3.5	1.2	9	0.64	0.58
48.4	.491	5.4	0.6	90.4	529.4	12.50	6.00	6.00	4.50	1.00	...	71.8	4.2	1.6	11	1.94	1.85
60.5	.528	5.7	0.5	92.2	534.4	1.50	1.00	14.50	14.00	0.00	...	65.0	4.4	0.6	24	5.94	5.59
55.7	.443	4.9	2.0	71.5	525.6	5.50	1.00	14.00	9.50	1.00	...	68.1	3.2	0.7	8	2.32	2.19
49.1	.349	3.9	1.4	73.1	533.8	7.50	10.50	6.00	4.00	2.00	...	48.7	4.0	0.2	11	2.95	2.80
47.3	.327	3.7	0.8	82.9	537.5	3.00	4.00	13.00	7.00	4.00	...	58.6	3.1	0.1	15	3.69	3.43
38.2	.230	3.7	0.6	77.0	550.9	6.00	8.00	7.50	6.50	2.00	...	76.9	2.9	0.5	12	3.19	2.85
36.8	.219	2.5	0.5	84.2	552.7	3.50	4.00	13.50	7.00	3.00	...	63.8	3.0	0.1	16	3.53	3.03
45.5	.329	3.7	0.9	81.3	540.2	...	66.00	123.50	94.50	25.00	...	71.9	3.4	0.7	189	36.36	33.69

Long. 8° 40' W. Height above Sea feet.

36.0	.213	2.5	0.3	90.8	...	9.50	6.25	9.75	5.50	0.00	...	...	6.7	6.3	21	1.29	...
43.8	.286	3.3	0.4	89.5	...	3.00	4.50	12.75	7.75	0.00	...	...	8.0	6.9	22	3.25	...
42.0	.267	3.0	0.8	79.8	...	5.75	6.00	14.50	4.75	0.00	...	...	6.3	7.9	15	2.27	...
46.6	.317	3.6	0.9	78.8	...	4.50	4.50	13.50	7.50	0.00	...	...	7.3	8.6	21	3.64	...
49.4	.354	3.9	1.8	68.5	...	10.25	6.50	9.00	5.25	0.00	...	...	5.6	4.1	6	0.86	...
53.8	.414	4.6	1.3	78.5	...	12.25	5.50	8.75	3.50	0.00	...	...	7.6	8.7	21	4.02	...
57.3	.471	5.2	1.0	84.1	...	3.25	0.75	14.75	12.25	0.00	...	...	7.7	7.9	23	3.79	...
58.0	.484	5.3	1.5	78.0	...	4.50	4.50	14.75	7.25	0.00	...	...	7.2	6.4	12	1.10	...
52.0	.389	4.3	0.9	83.0	...	8.50	11.75	5.00	4.75	0.00	...	...	7.0	6.6	10	2.15	...
48.7	.345	3.9	0.6	87.2	...	3.00	7.00	14.00	7.00	0.00	...	...	6.5	6.7	23	4.51	...
40.0	.248	2.8	0.4	86.5	...	9.00	12.50	5.25	3.25	0.00	...	...	7.5	5.4	14	2.26	...
37.3	.223	2.6	0.2	91.2	...	4.75	2.75	13.50	10.00	0.00	...	...	6.2	5.2	19	2.97	...
47.1	.337	3.9	0.8	83.2	...	78.25	72.50	135.50	73.75	0.00	...	...	6.9	6.9	212	31.91	...

* October—28 days only.

† Too imperfect to be of use.

Appendix

CORK.

Lat. 51° 53' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	29.532	29.931	28.389	54.0	22.0	32.0	47.0	29.6	17.4	38.3	57.7	21.1	40.4	37.8
February	29.723	30.068	29.083	59.0	31.0	28.0	55.2	36.1	19.1	45.6	62.1	27.1	46.4	42.6
March	29.714	30.149	29.603	61.0	29.0	32.0	56.3	33.8	22.5	45.0	66.4	24.4	47.9	41.3
April	29.532	30.052	28.700	62.0	34.0	28.0	58.9	37.4	21.5	48.1	71.4	29.7	52.2	46.5
May	29.857	30.290	29.443	68.0	35.0	35.0	64.8	36.5	28.3	50.6	78.1	28.4	56.3	52.4
June	29.682	30.018	29.158	73.0	36.0	37.0	67.1	47.5	19.6	57.3	84.8	40.5	60.9	55.3
July	29.523	29.880	29.182	72.0	43.0	29.0	67.4	48.1	19.3	57.7	107.7	40.9	62.0	57.6
August	29.714	30.206	29.127	78.0	40.0	38.0	70.6	50.2	20.4	60.4	116.5	42.8	64.4	60.2
September	29.616	30.066	28.677	71.0	33.6	38.0	64.5	44.6	19.9	54.5	98.6	36.0	58.7	54.8
October	29.582	30.099	28.834	64.0	30.0	34.0	59.2	21.9	17.3	50.5	77.4	33.1	54.6	51.3
November	29.715	29.982	29.285	58.0	28.0	30.0	52.1	35.7	16.4	43.9	61.1	26.4	45.4	42.8
December	29.796	30.206	28.797	63.0	24.0	29.0	47.6	32.0	15.6	39.8	57.3	2.6	42.2	39.5
Yearly Sum, Means, and Totals	29.663	30.076	29.097	64.4	31.9	32.5	59.2	39.4	19.8	49.3	78.2	30.9	52.7	43.7

CURRAGH CAMP.

Lat. 52° 8' N.

January ...	29.246	29.766	28.018	51.7	22.2	29.5	42.6	28.6	14.0	35.6	51.0	22.6	36.7	35.1
February ...	29.382	29.936	29.367	58.6	27.3	31.3	51.5	37.8	13.7	44.6	63.4	32.8	45.2	42.9
March ...	29.442	30.100	29.641	66.5	25.4	41.1	53.6	37.8	15.8	45.7	74.7	32.8	46.2	44.6
April ...	29.246	29.671	28.481	64.4	28.9	35.5	58.0	40.8	17.2	49.4	84.0	36.8	50.6	48.2
May ...	29.903	29.853	29.284	76.4	30.6	46.3	65.5	42.1	23.4	53.8	98.1	37.1	57.9	53.9
June ...	29.446	29.860	28.966	75.5	39.4	36.1	67.3	47.3	20.0	57.3	98.6	41.8	59.4	53.3
July ...	29.269	29.649	28.907	74.6	44.0	30.6	68.9	49.4	19.5	59.1	99.3	44.2	61.1	57.3
August ...	29.479	29.989	29.923	84.2	44.4	39.8	72.4	50.4	22.0	61.4	101.4	45.0	64.1	59.0
September ...	29.412	29.894	28.622	74.8	29.1	45.7	63.6	42.9	20.7	53.2	98.6	38.2	55.8	51.8
October ...	29.356	29.868	28.643	64.8	27.0	37.8	57.9	41.1	16.8	49.5	78.4	36.6	51.5	49.0
November ...	29.484	29.740	29.043	58.4	20.1	38.3	49.2	33.0	16.2	41.1	66.1	27.4	42.4	39.7
December ...	29.473	29.960	28.604	66.9	18.4	38.5	46.8	32.3	13.5	39.0	58.0	28.2	39.7	37.5
Yearly Sum, Means, and Totals ...	29.403	29.772	28.792	67.3	29.7	37.6	58.0	40.3	17.7	49.2	80.2	35.3	50.9	47.8

DUBLIN.

Lat. 55° 25' N.

January ...	29.613	30.134	28.316	52.0	21.0	31.0	42.6	30.4	12.2	36.5	61.0	25.5	38.0	26.4
February ...	29.759	30.245	29.161	69.9	27.2	42.7	52.9	38.9	14.0	45.9	78.0	33.9	47.2	44.6
March ...	29.620	30.443	29.068	63.4	26.0	37.4	54.6	37.4	17.2	46.0	86.4	32.0	49.0	44.9
April ...	29.617	30.027	28.790	63.4	26.0	37.4	57.0	40.4	16.6	48.7	102.3	35.7	51.5	48.0
May ...	29.961	30.212	29.692	77.8	31.0	46.8	63.4	41.2	22.2	52.3	114.8	37.4	57.4	51.7
June ...	29.616	30.209	28.336	74.0	35.2	38.8	66.0	46.8	19.2	56.4	114.3	43.7	59.4	54.6
July ...	29.620	30.275	29.243	77.0	42.8	34.2	69.9	49.8	20.1	59.8	123.5	45.3	62.6	56.0
August ...	29.635	30.311	29.187	81.2	40.6	40.6	72.0	50.9	21.1	61.4	119.2	45.2	65.3	59.7
September ...	29.779	30.249	28.972	74.5	28.2	45.3	62.3	44.0	18.3	53.2	103.6	37.3	56.8	52.8
October ...	29.706	30.194	28.905	66.0	29.4	36.6	59.5	42.7	16.8	51.1	85.0	35.2	53.9	50.7
November ...	29.860	30.120	29.344	58.4	18.9	39.5	49.1	34.1	15.0	41.6	70.5	28.0	48.8	41.2
December ...	29.688	30.315	28.871	57.0	20.0	37.0	46.7	33.4	13.3	40.0	64.0	25.9	41.8	40.4
Yearly Sum, Means, and Totals ...	29.773	30.203	29.077	67.8	28.9	38.9	58.0	40.8	17.2	49.4	95.1	36.4	52.2	48.6

No. XVI—continued.

Long. 8° 21' W. Height above Sea 257 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily hori- zontal Movement of the Air.				On the Ground.	Feet above the 25 Ground.
											lbs. per sq. foot.	Miles.				Inches	Inches.
34.5	.200	2.3	0.6	80.0	547.3	11.75	1.50	6.75	11.00	0.00	...	159.6	8.0	4.0	20	4.81	4.02
38.3	.232	2.7	1.0	74.2	544.1	2.50	0.00	8.50	17.00	0.00	...	159.6	8.0	4.0	19	4.72	3.84
34.0	.195	2.3	1.5	58.3	542.5	10.00	7.25	2.00	11.75	0.00	...	142.1	7.0	3.9	9	2.05	1.76
44.7	.296	3.4	1.1	76.0	534.5	3.50	1.75	9.25	15.50	0.00	...	149.1	7.0	4.0	16	2.71	2.33
46.8	.346	3.9	1.2	75.9	535.3	6.75	3.75	5.00	15.50	0.00	...	134.9	8.0	4.2	6	1.85	1.59
50.4	.351	4.1	1.9	69.0	526.3	11.25	3.50	5.50	9.75	0.00	...	153.2	8.0	4.7	13	4.97	4.49
53.8	.416	4.6	1.6	73.0	523.1	5.75	0.00	9.00	16.25	0.00	...	150.9	8.0	5.0	24	7.95	7.06
56.7	.462	5.1	1.6	76.0	533.8	6.00	2.00	10.00	13.00	0.00	...	137.7	7.0	4.6	8	2.36	2.09
51.3	.379	4.3	1.3	76.5	528.3	15.00	4.25	1.75	9.00	0.00	...	137.8	7.0	4.8	6	3.53	3.15
48.2	.336	3.8	1.0	78.8	532.3	4.50	1.00	10.25	15.25	0.00	...	144.3	7.9	4.9	22	6.65	6.77
38.8	.236	2.7	0.9	75.4	543.9	11.25	9.75	3.00	6.00	0.00	...	147.3	7.3	4.8	12	3.64	3.20
36.2	.214	2.5	0.6	80.1	550.1	10.25	1.25	7.00	12.50	0.00	...	146.0	7.9	4.8	13	5.86	5.22
42.1	.313	3.5	1.2	72.5	536.0	98.50	36.00	78.00	152.50	0.00	...	146.8	7.0	4.3	168	50.70	44.62

Long. 4° 48' W. Height above Sea 450 feet.

38.8	.187	2.2	0.4	86.3	546.0	4.25	4.50	14.00	8.25	0.00	...	325.2	8.0	4.2	16	3.82	3.37
40.3	.249	2.9	0.6	83.1	539.0	2.00	2.75	12.50	10.75	0.00	...	406.8	8.2	5.0	15	2.27	1.92
40.6	.254	3.0	0.7	82.0	538.9	5.25	4.60	11.50	9.75	0.00	...	408.5	7.0	5.5	10	1.54	1.25
45.7	.307	3.5	0.7	83.8	530.3	4.25	4.25	12.75	8.75	0.00	...	270.2	7.2	5.0	16	2.77	2.42
50.3	.365	4.1	1.3	75.9	528.9	10.25	7.25	5.25	8.25	0.00	...	230.9	4.1	4.7	8	0.79	0.67
51.6	.384	4.3	1.4	76.8	524.4	8.50	7.00	9.00	5.50	0.00	...	271.6	6.6	4.2	17	1.59	1.37
51.0	.417	4.7	1.3	78.0	519.4	4.75	0.25	10.50	15.50	0.00	...	312.5	6.8	3.5	28	5.72	5.08
54.7	.430	4.8	1.8	71.6	520.1	4.25	3.00	11.75	12.00	0.00	...	275.0	5.4	3.6	12	1.65	1.46
48.0	.338	3.8	1.2	75.8	527.9	10.50	7.50	5.25	6.75	0.00	...	237.4	4.9	3.2	8	1.93	1.76
46.5	.317	3.5	0.7	83.0	531.4	2.50	2.75	13.50	12.25	0.00	...	298.2	7.4	4.3	19	3.17	2.85
36.4	.216	2.5	0.6	80.1	544.1	6.00	6.75	8.75	8.50	0.00	...	273.2	7.2	4.3	8	1.50	1.35
34.6	.201	2.3	0.5	82.4	546.9	3.50	2.25	12.50	12.75	0.00	...	295.6	8.1	4.0	16	2.50	2.26
45.1	.305	3.8	0.9	75.8	533.1	66.00	52.75	127.25	119.00	0.00	...	301.2	7.6	4.3	173	29.25	25.76

Long. 6° 20' W. Height above Sea 72 feet.

34.2	.197	3.0	0.4	86.2	551.6	1.25	7.00	6.75	16.00	0.00	...	112.7	7.8	4.1	20	2.56	...
41.7	.264	3.1	0.7	82.0	543.7	1.25	5.25	8.25	13.25	0.00	...	104.6	7.3	4.6	14	1.43	...
40.5	.253	2.9	1.1	72.4	543.0	0.75	5.50	12.75	12.00	0.00	...	161.5	5.9	4.3	11	1.07	...
44.4	.293	3.3	0.9	77.0	536.3	0.75	10.50	5.25	13.50	0.00	...	87.4	7.2	4.4	18	3.27	...
46.5	.317	3.6	1.7	66.9	536.1	4.50	9.00	4.25	13.25	0.00	...	56.0	4.9	5.5	8	0.36	...
50.3	.366	4.1	1.6	72.0	531.2	6.25	7.00	7.00	9.75	0.00	...	65.4	5.3	5.0	15	2.32	...
54.1	.419	4.6	1.7	74.0	524.1	0.00	2.25	10.75	17.00	1.00	...	86.5	6.7	4.9	24	3.85	...
55.1	.435	4.8	2.1	70.3	525.1	3.50	4.50	11.00	12.00	0.00	...	68.4	5.8	3.5	10	1.21	...
49.2	.350	4.0	1.2	75.8	533.3	9.00	5.25	6.75	9.00	0.00	...	78.5	6.3	3.6	13	3.12	...
47.7	.329	3.7	1.0	78.8	535.2	1.00	4.50	12.75	12.75	0.00	...	103.8	6.2	5.0	15	2.63	...
38.2	.230	2.7	0.6	80.0	549.3	2.75	11.50	6.00	9.75	0.00	...	115.2	6.5	4.2	13	1.23	...
38.7	.236	2.7	0.3	89.4	552.0	1.00	0.00	12.25	17.75	0.00	...	132.6	3.5	6.0	15	1.10	...
45.0	.307	3.5	1.1	77.1	538.4	32.00	72.25	103.72	156.00	1.00	...	102.7	6.1	4.4	176	24.15	...

Appendix

FERMOY.

Lat. 52° 2' N.

Month.	Readings of the Barometer.			Temperature of the Air							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	51.3	18.0	33.3	45.4	28.7	16.7	37.0	...	...	37.1	35.7
February	60.0	28.2	31.8	51.9	38.6	13.3	45.2	...	...	46.5	43.9
March	65.0	25.0	40.0	54.0	35.3	18.7	44.6	...	...	48.1	44.3
April	64.0	29.0	35.0	58.6	40.8	17.8	49.7	...	...	52.6	47.9
May	74.0	31.0	43.0	64.0	42.2	21.8	53.1	...	...	56.9	50.4
June	82.0	36.0	46.0	70.3	46.4	23.9	59.3	...	...	...	...
July	75.0	42.8	32.0	69.3	45.7	23.6	57.5	...	...	61.8	56.2
August	79.0	35.0	44.0	72.2	48.4	23.8	60.3	...	...	66.0	60.0
September	74.0	29.0	45.0	66.3	44.6	21.7	55.4	...	...	58.1	53.7
October	69.0	29.0	40.0	58.8	40.4	18.4	49.6	...	...	52.7	49.8
November	70.0	18.0	52.0	51.2	33.5	17.7	42.3	...	...	45.2	42.9
December	64.5	15.5	39.0	48.0	30.3	17.7	39.1	...	...	41.8	40.3
Yearly Sums, Means, and Totals	68.1	27.9	40.2	59.2	39.6	19.6	49.4	...	...	51.6	47.7

LIMBRICK.

Lat. 52° 40' N.

January ...	...	...	...	52.1	20.4	31.7	44.1	27.9	16.2	36.0	...	...	39.4	38.0
February ...	...	...	...	56.4	28.6	27.8	51.8	36.9	14.9	44.3	...	...	48.1	46.2
March ...	...	...	...	67.6	27.4	40.2	54.0	35.4	18.6	44.7	...	...	49.9	46.6
April ...	...	...	...	62.6	27.9	34.7	59.0	40.0	19.0	49.5	...	...	54.4	52.2
May ...	...	...	...	86.0	30.2	55.8	66.7	40.9	25.8	53.8	...	...	61.4	58.1
June ...	...	...	...	74.6	38.6	36.0	68.9	46.2	23.7	57.0	...	...	63.7	59.8
July ...	...	...	...	72.7	39.4	33.3	68.7	46.7	22.0	57.7	...	...	64.4	60.7
August ...	...	...	...	79.5	41.5	38.0	70.8	48.7	22.1	59.7	...	...	66.0	61.8
September ...	...	↑	↑	72.9†	29.0†	43.9†	68.2†	41.6†	24.6†	53.9†	...	...	59.8†	55.7*
October ...	...	...	...	69.9	26.1	43.8	63.0	38.3	24.7	50.6	...	...	53.9	51.2
November ...	...	...	...	66.5	17.9	38.6	51.5	31.3	20.2	41.4	...	...	44.6	41.9
December ...	...	...	...	55.7	11.8	43.9	50.4	28.0	22.4	39.0	...	...	42.1	40.3
Yearly Sums, Means, and Totals ...	...	...	...	67.2	28.2	39.0	59.6	38.4	21.2	49.0	...	...	53.9	51.0

TEMPLEMORE.

Lat. 52° 48' N.

January ...	...	...	...	50.0	15.0	35.0	41.9	28.7	13.2	35.3	50.9	...	38.0	36.0
February ...	...	...	...	55.0	27.0	28.0	50.1	36.1	14.0	43.1	71.4	...	46.0	44.5
March ...	...	...	...	65.0	25.0	40.0	52.9	33.7	19.2	43.3	89.5	...	47.0	45.0
April ...	...	...	...	63.0	26.0	37.0	57.4	39.1	18.3	49.2	96.0	...	52.4	50.0
May ...	...	...	...	77.4	30.4	47.0	65.1	41.1	24.0	53.1	114.9	...	58.6	55.4
June ...	...	...	...	71.9	38.9	33.0	66.1	45.6	20.5	55.8	113.5	...	60.4	57.2
July ...	...	...	...	75.2	41.4	33.8	68.2	47.0	21.2	57.6	115.8	...	62.2	59.3
August ...	...	...	...	80.1	37.7	42.4	70.5	48.6	21.9	59.5	116.9	...	64.8	61.9
September ...	...	...	...	69.8	27.8	42.0	61.1	41.2	19.9	51.1	120.6	...	56.2	53.9
October ...	...	...	...	67.7	26.6	36.1	58.5	38.4	20.1	49.4	90.9	...	53.6	51.3
November ...	...	...	...	61.2	16.2	45.0	52.6	31.4	21.2	42.0	68.1	...	42.2	40.5
December ...	...	...	...	54.2	15.0	39.2	46.0	28.3	17.7	37.1	53.4	...	39.8	36.8
Yearly Sums, Means, and Totals ...	...	...	...	65.5	27.3	38.2	57.5	38.3	19.2	47.9	89.5	...	51.8	49.5

* No wet bulb readings.

† For 26 days only

No. XVI—continued.

Long. 8° 18' W. Height above Sea 176 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).							Atmospherical Conditions.										
Mean Temperature of Dew Point.	Mean Elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm or nearly calm Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pressure of Wind.	Mean daily Horizontal Movement of the Air.				On the Ground.	Feet above the Ground.
33.7	.194	2.2	0.4	87.9	...	7.00	7.25	7.75	8.50	0.50	lbs. per sq. foot	Miles	6.1	6.0	23	0.41	...
40.9	.207	3.0	0.6	82.3	...	5.75	1.75	8.25	12.25	0.00	...	...	5.6	3.8	21	6.20	...
40.1	.248	2.7	1.0	74.2	...	8.25	1.25	7.25	14.25	0.00	...	...	4.3	2.7	15	3.32	...
43.2	.279	3.2	1.2	70.5	...	5.00	10.75	10.00	4.25	0.00	...	...	5.2	2.8	19	4.59	...
44.4	.293	3.3	1.3	63.4	...	3.00	1.25	12.50	14.25	0.00	...	...	4.0	2.8	4	0.25	...
51.4	.350	4.2	2.0	69.0	...	14.00	1.00	1.00	14.00	0.00	...	...	5.4	3.8	18	7.25	...
55.1	.434	4.8	2.2	68.0	...	15.50	0.00	0.00	15.50	0.00	...	...	5.7	3.8	29	5.94	...
49.7	.358	4.0	1.4	74.0	...	15.25	3.75	0.50	11.50	0.00	...	...	4.4	1.9	10	2.40	...
46.9	.322	3.7	0.9	81.3	...	7.75	13.00	6.25	3.00	0.00	...	...	3.9	2.4	8	3.22	...
40.3	.234	2.9	0.6	83.1	...	10.50	13.75	5.00	1.75	0.00	...	...	4.8	3.5	22	5.39	...
38.4	.224	2.7	0.4	88.8	...	16.00	7.50	0.00	5.50	1.00	...	...	5.2	2.7	11	2.78	...
44.0	.296	3.3	1.1	76.6	...	5.75	3.50	12.00	9.75	0.00	...	...	5.0	3.3	16	2.90	...
44.0	.296	3.3	1.1	76.6	...	113.75	84.75	70.50	114.50	1.50	...	...	4.3	3.1	196	44.53	...

Long. 80° 6' W. Height above Sea 84 feet.

36.2	.214	2.3	0.4	89.0	...	5.00	8.00	7.25	8.75	2.00	...	...	3.7	2.3	19	0.46	...
44.1	.289	3.3	0.5	86.7	...	3.50	8.75	9.25	6.50	1.00	...	...	4.0	2.6	16	0.26	...
44.2	.291	3.2	0.6	83.9	...	6.25	9.25	5.25	7.25	3.00	...	...	4.9	2.7	12	0.17	...
50.0	.361	4.1	0.7	85.0	...	3.75	8.25	6.25	9.25	2.50	...	...	4.8	2.4	17	0.35	...
55.3	.437	4.8	1.2	80.6	...	4.50	7.00	8.00	6.50	5.00	...	...	4.6	2.3	5	0.08	...
56.6	.459	5.1	1.5	78.2	...	3.50	11.75	4.75	6.50	3.50	...	...	4.6	2.4	15	0.28	...
57.6	.477	5.2	1.4	78.5	...	8.25	7.50	11.50	7.25	1.50	...	...	5.0	3.6	27	0.49	...
58.4	.490	5.4	1.6	77.0	...	5.50	10.75	8.00	2.25	4.50	...	...	4.7	3.9	12	0.19	...
52.1†	.390†	4.3†	1.4†	76.2†	...	5.00†	6.00†	6.50†	7.50†	1.00†	...	...	4.9	3.3†	8†	0.19†	...
49.0	.374	3.9	0.7	82.6	...	4.50	7.00	15.00	4.50	0.00	...	...	5.2	3.5	22	3.40	...
38.7	.236	2.7	0.6	79.7	...	14.50	6.50	4.00	5.00	0.00	...	...	5.6	1.4	11	1.21	...
38.1	.230	2.6	0.5	86.4	...	5.00	2.00	18.50	4.50	1.00	...	...	6.0	2.8	18	3.29	...
48.3	.354	3.9	0.9	82.0	...	64.25	92.75	104.25	74.75	25.00	...	...	4.8	2.8	182	10.37	...

Long. 7° 49' W. Height above Sea feet.

33.3	.190	2.2	0.5	83.0	...	6.25	7.75	7.75	9.25	...	...	...	7.8	6.7	21	4.25	...
42.8	.276	3.2	0.4	89.5	...	3.00	1.75	8.50	14.75	...	...	...	8.1	6.2	11	2.68	...
42.8	.275	3.2	0.5	86.0	...	4.25	4.50	9.25	13.00	...	...	...	6.7	5.6	13	2.13	...
47.6	.330	3.7	0.7	83.6	...	4.75	3.75	7.75	13.75	...	...	...	6.6	5.8	17	3.80	...
52.5	.396	4.4	1.1	80.4	...	12.00	7.25	3.25	8.50	...	...	...	4.8	4.7	8	0.93	...
55.0	.432	4.8	1.7	83.4	...	8.50	4.25	6.75	10.50	...	...	...	7.0	7.1	19	2.78	...
56.8	.463	5.1	1.1	82.8	...	4.50	0.25	5.50	20.75	...	...	...	6.7	6.2	28	4.85	...
59.5	.510	5.6	1.2	83.4	...	6.75	0.00	11.00	13.25	...	...	...	5.7	4.9	10	2.05	...
51.7	.356	4.3	0.7	85.2	...	7.00	6.50	9.50	8.00	...	...	...	6.1	5.0	9	1.96	...
49.1	.347	3.9	0.7	84.5	...	5.00	2.50	11.50	12.00	...	...	...	6.4	5.9	23	2.76	...
38.4	.233	2.7	0.4	87.1	...	8.50	3.75	5.00	12.75	...	...	...	7.3	3.9	10	1.60	...
37.5	.225	2.7	0.2	92.0	...	3.75	2.75	13.25	11.25	...	...	...	7.1	4.3	19	2.62	...
47.2	.339	3.8	0.8	85.1	...	74.25	44.00	99.00	147.75	...	...	...	6.5	5.5	188	32.31	...

* No wet bulb readings.

† For 26 days only.

Appendix

Abstract of Results of Meteorological Observations

Stations, with their Height above the Sea.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and cor- rected to 32°.	Lowest reduced and cor- rected to 32°.	Highest during Year.	Lowest during Year.	Range during Year.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
Athlone* ... 504 ft.	..	...	...	81·5	19·0	62·5	60·2	39·3	20·9	49·7	...	...	53·0	46·2
Belfast ... 50 „	29·817	30·550	28·327	81·0	21·0	60·0	57·6	41·5	16·1	49·5	78·9	40·1	51·9	49·1
Buttevant ... ..	...	...	...	81·0	12·0	69·0	58·8	38·3	20·3	48·5	...	...	52·3	49·7
Cork ... 257 ft.	29·663	30·260	28·389	73·0	22·0	51·0	58·2	39·4	19·8	49·3	78·2	30·9	52·7	43·7
Carragh Camp 450 „	29·403	30·100	28·018	84·2	18·4	65·8	58·0	40·3	17·7	49·2	80·2	35·3	50·9	47·8
Dublin ... 72 ft.	29·773	30·443	28·316	81·2	18·9	62·3	58·0	40·8	17·2	49·4	95·1	35·4	52·2	48·6
Fermoy ... 176 „	...	...	...	82·0	15·5	66·5	58·2	39·6	19·6	49·4	...	...	51·6	47·7
Limerick ... 75 „	...	...	...	86·0	11·8	74·2	59·6	38·4	21·2	49·0	...	...	53·9	51·0
Templemore... ..	...	...	...	80·1	15·0	65·1	57·5	38·3	19·2	47·9	...	...	51·8	49·5

* Athlone for 11 months only.

No. XVI—continued.

taken at Stations in Ireland in the Year 1871.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.												
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.		In a Cubic Foot of Air.		Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Rain fall on the Ground.	Latitude.	Longitude.
	Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.	North.		East.	South.	West.	Mean daily pres- sure of Wind.		Mean daily Hori- zontal Movement of the Air.							
											lbs. per sq. foot.	Miles				Inches	°	°
45.4	.311	3.2	1.3	76.3	...	66.00	67.75	94.50	133.75	3.00	...	...	7.0	4.5	216	38.07	53.26 N	8.0 W
45.5	.329	3.7	0.9	81.3	540.2	68.00	55.00	122.50	94.50	25.00	...	71.0	3.4	0.7	168	36.36	54.36 "	5.57 "
47.1	.337	3.8	0.8	83.2	...	75.25	72.50	135.50	78.75	0.00	...	...	6.9	6.9	212	31.91	52.14 "	8.40 "
42.1	.313	3.5	1.2	72.5	536.0	98.50	36.00	73.00	152.50	0.00	...	146.8	7.0	4.3	168	50.70	51.53 "	8.21 "
45.1	.305	3.8	0.9	79.8	533.1	66.00	52.75	127.25	119.00	0.00	...	301.2	7.6	4.3	173	29.25	52.8 "	4.48 "
45.0	.307	3.5	1.1	77.1	539.4	32.00	72.25	103.75	156.00	1.00	...	102.7	6.1	4.4	176	24.5	53.25 "	6.20 "
40.0	.295	3.3	1.1	76.6	...	113.75	61.75	70.50	114.00	1.50	...	...	4.9	3.1	196	44.53	52.2 "	8.18 "
48.3	.354	3.9	0.9	82.0	...	64.25	92.75	104.25	74.75	25.00	...	...	4.8	2.8	182	10.37	52.40 "	8.16 "
47.2	.339	3.8	0.8	85.1	...	74.25	44.00	99.00	147.75	0.00	...	...	6.5	5.5	188	32.31	52.48 "	7.9 "

APPENDIX

Abstract of Results of Meteorological Observations

CAPE OF GOOD HOPE.

Lat. 34° 56' S.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Height reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean.				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January ...	29.862	30.063	29.671	91.2	52.7	38.5	81.8	56.7	23.1	70.2	131.5	48.2	72.2	62.5
February ...	29.866	30.084	29.667	90.0	52.2	46.8	84.3	57.1	27.2	70.7	130.9	48.1	72.4	62.3
March ...	29.890	30.442	29.771	96.2	49.5	46.7	79.8	56.7	23.1	68.2	128.2	54.9	70.0	61.2
April ...	30.012	30.262	29.731	91.0	43.0	48.0	77.4	54.2	23.2	65.8	124.3	52.6	67.8	61.9
May ...	30.003	30.388	29.634	88.7	40.5	48.2	72.6	53.2	19.4	62.9	99.8	51.3	63.8	61.8
June ...	30.114	30.467	29.807	87.0	40.0	47.0	68.0	50.1	17.9	59.0	95.7	47.4	59.1	55.3
July ...	30.144	30.493	29.760	75.2	39.0	36.2	67.2	47.5	19.7	57.3	96.5	45.5	58.7	53.8
August ...	30.068	30.507	29.794	84.0	43.0	41.0	68.0	49.0	19.0	58.5	108.9	47.1	59.2	54.8
September ...	30.059	30.361	29.839	93.0	49.0	44.0	73.4	52.2	21.2	62.8	120.7	50.3	64.3	60.0
October ...	29.947	30.287	29.761	89.0	45.5	43.5	75.4	52.6	22.8	64.0	125.4	51.2	66.6	58.4
November ...	29.987	30.261	29.730	90.0	48.0	42.0	77.8	53.9	23.9	65.8	128.6	52.6	67.7	59.3
December ...	29.916	30.298	29.692	100.0	53.2	46.8	83.1	58.2	24.9	70.6	131.0	56.9	72.9	62.5
Yearly Sums, Means, and Totals ...	29.988	30.322	29.738	90.3	46.3	44.0	75.7	53.6	22.1	64.6	118.4	50.5	66.2	59.5

FORT NAPIER, NATAL.

Lat. 29° 3' S.

January ...	27.571	27.781	27.306	98.0	52.0	46.0	82.7	59.9	22.8	71.3	...	...	74.2	67.2
February ...	27.630	27.898	27.364	100.0	50.0	50.0	80.0	58.6	21.4	69.3	...	...	72.7	66.2
March ...	27.625	27.908	27.250	93.5	50.0	48.5	83.5	59.0	24.5	71.2	...	...	74.4	66.3
April ...	27.710	27.993	27.447	95.0	42.0	53.0	79.4	52.9	26.5	66.1	...	...	71.6	61.8
May ...	27.725	28.013	27.427	88.0	36.0	52.0	77.7	48.6	29.1	63.1	...	...	68.1	58.4
June ...	27.774	28.080	27.373	83.0	30.0	53.0	73.4	42.7	30.7	58.0	...	...	64.1	51.9
July ...	27.761	28.086	27.402	84.0	34.0	50.0	72.3	42.3	30.0	57.3	...	...	62.7	51.7
August ...	27.759	28.158	27.299	91.0	35.0	56.0	76.9	45.3	31.6	61.1	...	...	67.9	53.8
September ...	27.714	28.088	27.282	98.0	39.0	59.0	82.5	50.5	32.0	66.6	...	...	72.5	60.3
October ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
November ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
December ...	27.598	27.995	27.995	94.7	49.5	46.2	77.1	55.7	21.4	66.4	...	...	69.0	64.1
Sums, Means, and Totals ...	27.686	28.000	27.336	93.0	41.7	51.3	78.5	51.5	27.0	65.0	...	...	69.7	60.2

HONG KONG.

Lat. 22° 16' N.

January ...	30.053	30.256	29.938	75.0	46.0	29.0	68.2	57.1	11.1	62.6	87.2	49.8	63.1	57.4
February ...	30.065	30.184	29.965	76.0	48.0	28.0	66.9	56.2	10.7	61.5	93.4	50.8	62.0	57.4
March ...	30.060	30.162	29.958	84.0	54.0	30.0	72.1	60.1	12.0	66.1	108.0	53.9	65.3	60.7
April ...	29.928	30.095	29.774	95.0	61.0	34.0	84.7	69.0	15.7	76.8	125.8	64.9	77.1	70.9
May ...	29.757	30.013	28.904	96.0	61.0	35.0	90.4	74.3	16.1	82.3	135.6	70.1	85.3	77.3
June ...	29.709	29.862	29.214	89.0	68.0	31.0	90.5	75.5	15.0	83.0	130.6	72.3	84.7	79.3
July ...	29.711	29.866	29.483	89.0	74.0	25.0	82.8	76.9	15.9	84.8	141.6	71.2	86.3	78.8
August ...	29.664	29.901	29.362	98.0	74.0	24.0	81.6	76.9	14.7	84.2	134.0	70.0	85.8	79.5
September ...	29.758	29.977	29.387	96.0	68.0	27.0	88.0	75.0	13.0	81.0	128.2	68.6	82.9	78.1
October ...	29.654	30.084	29.118	82.0	68.0	24.0	83.0	71.6	11.4	77.3	120.0	63.3	78.7	73.1
November ...	30.050	30.269	29.825	83.0	52.0	31.0	74.5	61.0	13.5	67.7	114.0	62.3	69.3	61.2
December ...	30.198	30.567	29.959	76.0	38.0	38.0	64.6	53.0	11.6	58.8	89.2	42.8	60.0	53.0
Yearly Sums, Means, and Totals ...	29.904	30.104	29.607	89.0	59.3	29.7	80.6	67.2	13.4	73.9	117.3	60.8	75.0	68.9

Returns useless.

No. XVII.

taken at Stations in Cape of Good Hope, China, and Straits Settlements in the Year 1871.

Long. 18° 17' E. Height above Sea 27 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hor- izontal Movement of the Air.				On the Ground.	Feet above the Ground.
55.2	.438	4.8	3.7	54.9	518.7	...	...	...	...	...	lbs. per sq. foot	Miles	2.1	5.9	2	0.21	...
54.8	.420	4.7	3.9	53.7	518.6	...	...	...	...	...	...	...	2.5	5.4	1	0.06	...
54.4	.424	4.7	3.3	57.8	521.5	...	...	...	...	...	...	...	3.7	5.2	4	0.49	...
57.3	.470	5.1	2.3	68.5	525.5	...	...	...	...	...	...	...	3.3	3.7	3	1.12	...
60.3	.522	5.8	0.3	88.8	529.0	...	...	...	...	...	...	...	5.6	4.5	13	2.18	...
51.9	.387	4.4	1.2	77.3	536.7	...	...	...	...	...	...	...	4.8	5.8	11	4.37	...
49.6	.354	4.0	1.6	71.5	537.8	...	...	...	...	...	...	...	4.0	4.3	8	2.05	...
50.9	.373	4.2	1.4	74.0	535.9	...	...	...	...	...	...	...	4.8	4.9	6	2.31	...
56.6	.457	5.0	1.6	75.5	530.0	...	...	...	...	...	...	...	4.4	4.4	6	0.91	...
51.8	.385	4.3	2.9	58.8	526.0	...	...	...	...	...	...	...	3.7	3.9	2	0.56	...
52.6	.398	4.3	3.1	58.4	524.9	...	...	...	...	...	...	...	4.1	2.8	10	0.94	...
54.8	.431	4.8	4.0	52.8	519.1	...	...	...	...	...	...	...	3.0	2.2	5	0.87	...
54.2	.422	4.7	2.5	66.1	527.0	...	...	...	...	...	...	...	3.8	4.3	71	16.07	...

Long. 30° 2' E. Height above Sea 2,200 feet.

62.1	.558	6.0	3.1	66.0	476.7	3.75	18.25	6.75	1.75	0.50	...	...	5.5	3.9	21	4.73	...
61.3	.545	5.8	2.9	67.2	479.0	2.00	18.25	6.75	1.00	0.00	...	...	5.2	4.0	19	2.80	...
60.4	.526	5.7	2.5	61.6	477.9	3.75	19.00	6.25	1.50	0.00	...	...	4.0	3.5	15	3.24	...
54.4	.425	4.6	3.8	54.4	482.0	3.50	19.50	5.75	1.25	0.00	...	...	3.2	3.5	10	4.42	...
50.7	.371	4.1	3.5	53.2	486.0	3.25	16.00	10.50	1.25	0.00	...	...	2.2	3.2	1	0.15	...
41.7	.364	3.0	3.6	44.4	491.1	3.25	14.75	9.00	2.00	1.00	...	...	1.8	2.9	2	0.01	...
42.3	.270	3.0	3.4	47.0	492.1	3.00	15.00	9.00	3.50	0.50	...	...	1.7	3.1	4	0.90	...
42.7	.274	3.0	4.5	39.7	487.4	6.75	13.00	6.25	4.50	0.50	...	...	2.1	3.0	4	0.24	...
51.2	.377	4.1	4.5	47.4	481.7	4.00	19.00	6.00	1.50	0.50	...	...	3.3	3.0	7	0.95	...
...
60.3	.520	5.7	2.1	73.5	482.0	3.75	16.50	4.50	2.25	4.00	...	...	8.2	5.1	21	9.32	...
52.7	.413	4.5	3.5	55.4	483.5	37.00	169.25	69.75	20.50	7.50	...	...	3.7	3.4	104	26.76	...

304 days only.

Long. 114° 19' E. Height above Sea 43 feet.

52.6	.397	4.4	2.0	69.6	513.8	7.75	20.75	1.50	0.00	1.00	...	...	3.4	2.8	1	0.05	0.04
53.5	.410	4.5	1.7	74.0	532.7	6.25	17.75	2.00	0.00	2.00	...	...	4.3	3.3	8	3.15	3.03
56.9	.465	5.1	1.7	75.0	528.9	6.25	20.75	2.00	0.00	2.00	...	...	4.2	3.4	3	0.31	0.29
65.6	.653	7.4	3.0	70.2	513.8	1.50	22.00	2.75	0.25	3.50	...	...	2.7	3.0	1	0.36	0.34
72.1	.789	8.4	4.6	64.3	502.9	0.25	10.50	14.25	4.50	1.50	...	...	4.1	2.9	13	14.55	11.75
75.8	.892	9.4	3.2	74.4	501.5	0.75	14.25	6.50	1.50	7.00	...	...	3.4	3.0	20	23.80	20.86
74.0	.841	8.8	4.5	66.3	500.1	0.75	11.00	11.75	5.00	2.50	...	...	2.2	2.6	15	10.21	8.63
75.4	.883	9.3	3.8	71.3	499.9	1.00	6.50	11.50	6.50	5.50	...	...	2.0	2.5	14	22.11	21.37
74.9	.863	9.2	2.8	76.7	504.2	5.75	17.00	1.25	3.00	3.00	...	...	2.2	2.6	16	18.93	17.47
69.2	.716	7.7	2.8	72.6	510.8	4.75	18.50	1.50	3.25	3.00	...	...	2.1	2.7	9	10.13	9.49
54.0	.432	4.7	3.1	59.6	525.0	4.25	18.25	0.00	4.00	3.50	...	...	1.6	2.4	4	0.47	0.33
46.8	.321	3.6	2.2	62.0	537.7	5.25	15.25	0.00	2.00	8.50	...	...	1.5	2.5	..	...	...
64.3	.638	6.8	2.9	69.6	514.3	44.50	192.50	55.00	30.00	43.00	...	...	2.8	2.8	104	104.13	93.60

Appendix

SINGAPORE.

Lat. 1° 16' N.

Month.	Readings of the Barometer.			Temperature of the Air.						Mean Daily Readings of					
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.		
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.	
January
February
March
April
May
June
July
August
September
October
November
December
Yearly Sum, Means, and Totals

Abstract of Results of Meteorological Observations

Stations, with their Height above the Sea.		Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
		Mean reduced and corrected to 32°	Highest reduced and cor- rected to 32°.	Lowest reduced and cor- rected to 32°.	Highest during Year.	Lowest during Year.	Range during Year.	Mean.				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
								Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
Cape of Good Hope ...	27	29.985	30.507	29.634	100.0	39.0	61.0	75.7	53.6	22.1	64.6	118.4	50.5	66.2	59.5
Fort Napier, Natal ...	2,157	27.696	28.158	27.213	100.0	30.0	70.0	78.5	51.5	27.0	65.0	...	...	69.7	60.2
Hong Kong, China ...	43	29.904	30.567	29.314	99.0	38.0	61.0	80.6	67.2	13.4	73.9	117.3	60.8	75.0	63.9
Singapore, Straits Settlements... }	116	29.287	29.494	29.131	109.0	67.2	41.8	96.9	71.7	25.2	84.3	145.5	70.6	81.4	76.9

No. XVII—continued.

Long. 103° 51' E. Height above Sea 116 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hori- zontal Movement of the Air.				On the Ground.	20 Feet above the Ground.
...	...	...	...	...	...	...	...	...	...	...	lbs. per sq. foot	Miles	...	...	...	Inches	Inches
...
71.9	.781	9.3	4.2	66.3	495.2	...	...	...	...	...	...	...	3.7	2.8	7	5.20	...
75.5	.880	9.4	2.6	78.0	495.8	...	...	...	...	...	...	...	5.9	3.8	9	6.67	...
76.3	.905	9.7	2.1	82.3	496.1	...	...	...	...	...	...	...	6.1	3.7	15	5.90	...
76.4	.911	9.7	1.4	88.0	498.1	...	...	...	...	...	...	...	5.5	3.6	17	10.20	...
76.4	.908	9.6	1.7	85.7	497.8	...	...	...	...	...	...	...	4.5	3.1	20	8.37	...
77.0	.927	9.9	1.4	88.0	498.0	...	...	...	...	...	...	...	5.3	3.2	21	13.82	...
76.9	.926	9.9	1.3	90.0	498.7	...	...	...	...	...	...	...	5.9	3.8	22	25.13	...
75.6	.887	9.5	1.1	90.0	499.6	...	...	...	...	...	...	...	6.8	3.6	25	15.87	...
75.1	.873	9.4	1.8	83.5	498.0	...	...	...	...	...	...	...	5.3	3.5	17	17.88	...
75.7	.877	9.5	1.9	83.5	496.4	...	...	...	...	...	...	...	5.5	3.5	153	109.02	...

taken at Stations in Cape of Good Hope, China, and Straits Settlements, in the Year 1871.

Hygrometrical Results from Glaisher's Tables (3rd edition)						Atmospherical Conditions.													
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Ball fall on the Ground.	Latitude.	Longitude.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hor- izontal Movement of the Air.							
54.2	.422	4.7	2.5	66.1	527.0	...	...	...	...	...	lbs. per sq. foot	Miles	3.8	4.3	71	160.7	34 56 S	18 17 E.
52.7	.413	4.5	3.5	55.4	483.5	37.00	69.25	69.75	20.50	7.50	...	...	3.7	3.4	104	26.76	29 3 ,,	30 2 ,,
64.3	.638	6.8	2.9	69.6	514.3	44.50	192.50	55.00	30.00	43.00	...	...	2.8	2.8	104	104.1	22 16 N.	114 19 ,,
75.7	.877	9.5	1.9	83.5	496.4	...	...	...	...	...	...	...	5.5	3.5	153	109.2	1 16 ,,	103 50 ,,

Appendix

Abstract of the Results of Meteorological Observations

HALIFAX, NOVA SCOTIA.

Lat. 44° 39' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	29.906	30.541	29.085	51.2	- 13.6	64.8	32.3	13.4	18.9	22.8	60.4	...	24.3	22.2
February	29.702	30.287	28.885	48.6	- 8.0	56.6	30.5	14.1	16.4	22.3	75.9	...	25.8	22.1
March	29.743	30.316	29.063	55.8	14.0	41.8	42.7	23.9	18.8	33.3	87.6	22.5	25.5	23.2
April	29.645	30.133	28.980	66.2	22.0	44.2	47.0	28.4	18.6	37.7	85.1	26.4	39.7	37.2
May	29.670	30.184	28.953	88.0	26.2	61.8	61.4	35.3	26.1	48.3	106.9	28.8	51.9	46.0
June	29.700	29.900	29.431	79.4	34.8	44.6	71.5	44.7	26.8	58.1	118.2	38.0	61.4	56.0
July	29.815	30.185	29.358	84.2	43.4	40.8	76.4	52.4	24.0	64.4	121.6	43.6	67.1	62.4
August	29.765	30.309	29.329	84.0	42.3	41.7	74.8	52.6	22.2	63.7	117.9	48.8	66.7	62.1
September	29.848	30.286	29.446	81.0	32.7	48.3	67.1	45.0	22.1	56.0	108.9	42.7	59.2	54.6
October	29.827	30.372	29.199	74.8	27.0	47.8	59.1	38.4	20.7	48.7	94.6	35.3	51.5	48.0
November	29.585	30.345	28.852	54.8	7.0	47.8	40.0	24.9	15.1	32.4	70.4	23.0	34.3	32.2
December	29.755	30.501	28.962	49.7	- 4.0	53.7	34.4	15.7	18.7	25.0	61.3	...	26.4	24.8
Yearly Sums, Means, and Totals	29.722	30.278	29.129	68.1	18.6	49.5	53.1	32.4	20.7	42.7	92.4	...	45.2	41.5

BARBADOES.

Lat. 13° 4' N.

January ...	29.961	30.074	29.860	87.0	69.0	18.0	85.3	70.7	14.6	78.0	132.8	69.1	80.9	73.5
February ...	30.037	30.191	29.922	86.5	66.0	20.5	85.0	69.0	16.0	77.0	139.2	67.0	80.3	71.6
March ...	30.011	30.118	29.887	89.0	68.0	21.0	86.4	70.1	16.3	78.2	143.5	66.0	82.3	72.4
April ...	29.988	30.071	29.872	90.0	69.5	20.5	87.9	71.5	16.4	79.7	144.5	65.0	83.9	73.4
May ...	29.995	30.082	29.899	90.6	73.0	17.5	88.8	75.5	13.3	82.1	150.0	64.0	84.7	74.5
June ...	30.013	30.076	29.929	90.5	73.0	17.5	88.7	75.3	12.4	82.5	141.0	63.0	84.6	75.3
July ...	29.986	30.083	29.895	91.0	73.5	17.5	89.0	75.4	13.6	82.2	144.3	62.0	84.5	76.1
August ...	29.946	30.042	29.784	92.5	73.0	19.5	88.5	76.6	11.9	82.5	144.0	73.4	84.7	77.8
September ...	29.948	30.041	29.849	90.0	74.5	15.5	88.2	75.7	12.5	81.9	144.7	72.3	84.7	77.4
October ...	29.922	30.031	29.821	89.5	73.0	16.5	87.8	73.1	12.7	81.4	144.9	72.0	83.8	76.6
November ...	29.917	30.024	29.796	90.0	71.0	19.0	87.0	74.2	12.8	80.6	142.0	70.2	83.6	75.9
December ...	30.002	30.131	29.907	88.5	70.5	18.0	86.2	73.1	13.1	79.6	140.0	69.0	82.1	73.6
Sums, Means, and Totals ...	29.977	30.080	29.866	89.6	71.2	18.4	87.4	73.6	13.8	80.5	142.4	69.9	83.3	74.8

NEWCASTLE, JAMAICA.

Lat. 18° 6' N.

January ...	...	...	...	84.0	52.0	32.0	74.9	54.6	20.3	64.7	139.6	51.1	66.9	62.2
February ...	...	...	...	79.0	52.0	27.0	76.2	54.4	20.8	64.8	139.2	42.2	66.2	62.2
March ...	...	...	...	90.0	51.0	39.0	78.0	54.4	23.6	66.2	139.2	49.8	67.5	62.9
April ...	...	...	...	93.0	45.0	48.0	80.8	55.0	25.8	67.9	135.5	51.5	69.8	64.9
May ...	...	...	...	92.0	54.0	38.0	82.0	56.5	25.5	69.2	132.6	52.6	69.7	65.5
June ...	...	...	...	92.0	55.0	37.0	82.2	58.2	24.0	70.2	139.1	52.5	72.2	66.6
July ...	...	...	...	95.0	53.0	42.0	82.3	58.3	24.0	70.3	139.4	50.2	70.9	65.3
August ...	...	...	...	87.0	55.0	32.0	82.7	58.9	23.8	70.8	138.9	52.0	72.4	66.9
September ...	...	...	...	89.0	54.0	35.0	82.4	58.2	24.2	70.3	138.0	53.3	72.3	65.7
October ...	...	...	...	88.0	50.0	38.0	78.4	57.6	20.8	68.0	129.6	53.6	69.9	66.3
November ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
December ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sums, Means, and Totals ...	...	...	...	...	...	...	...	...	...	...	...	...	69.8	64.9

* March - Instruments undergoing repair. Observations for 26 days only.

No. XVII—continued.

taken at Stations in North America and the West Indies, in the Year 1871.

Long. 63° 36' W. Height above Sea 175 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of days on which rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hor- izontal Movement of the Air.				On the Ground.	40 Feet above the Ground.
											lbs. per sq. foot.	Miles				Inches	Inches
16.9	.094	1.1	0.4	72.0	573.4	8.00	3.50	8.25	10.25	1.00	...	...	8.3	3.5	7	2.50	1.85*
12.0	.075	0.9	0.6	59.3	570.2	9.25	6.00	5.75	7.00	0.00	...	...	6.8	3.1	5	2.25	2.00*
29.6	.164	1.9	0.6	78.5	556.8	4.25	1.00	8.50	17.25	0.00	...	...	7.7	3.4	8	5.16	4.47*
33.9	.196	2.3	0.6	80.0	550.1	5.25	2.00	11.00	11.75	0.00	...	...	8.1	2.6	17	4.32	3.22*
40.0	.247	2.8	1.6	63.5	537.2	11.75	1.25	2.25	15.75	0.00	...	...	7.0	2.7	13	3.30	2.52
51.4	.379	4.2	1.9	70.0	527.0	4.75	0.50	8.00	16.75	0.00	...	263.9	6.4	3.3	13	3.59	2.55
54.6	.494	5.4	1.9	74.5	522.6	1.25	0.50	11.75	17.50	0.00	...	234.7	7.0	2.6	16	3.97	3.41
58.4	.489	5.4	1.8	75.0	522.2	4.50	0.25	12.75	13.50	0.00	...	310.7	7.2	2.4	12	4.28	3.44
50.5	.368	4.1	1.6	78.0	531.9	8.25	2.00	6.60	14.25	0.00	...	316.7	5.7	2.5	10	5.78	49.1
44.2	.290	3.3	1.0	75.2	539.8	Anemometer broken.					...	...	6.6	3.0	12	5.07	3.96
28.6	.197	1.9	0.5	78.9	565.3	13.00	0.75	4.60	8.75	0.00	...	320.1	7.6	4.1	12	4.42	3.06
17.1	.134	1.1	0.6	66.4	568.1	14.25	0.25	2.25	14.25	0.00	...	265.2	8.1	3.9	14	3.93	†
36.8	.254	2.9	1.1	72.2	546.2	84.50	21.00	80.60	147.00	1.00	...	...	7.2	3.1	139	48.57	...

Long. 59° 40' W. Height above Sea 25 feet.

68.5	.697	7.4	3.8	65.4	510.5	15.50	15.50	0.00	0.00	0.00	...	118.4	4.8	4.4	22	3.73	2.06
65.7	.632	6.8	4.3	60.5	512.8	14.00	14.00	0.00	0.00	0.00	...	207.2	4.2	§	15	1.57	0.56
65.8	.635	6.8	5.0	57.3	510.5	10.00	21.00	0.00	0.00	0.00	...	191.7	3.9	§	8	0.48	0.11
66.4	.660	6.9	5.5	55.5	508.5	9.75	20.25	0.00	0.00	0.00	...	202.7	4.1	4.7	8	0.49	0.16
68.0	.683	7.2	5.4	56.4	507.6	9.50	21.25	0.25	0.00	0.00	...	236.1	4.0	5.2	9	0.74	0.20
69.5	.723	7.7	4.9	60.2	507.9	12.25	17.25	0.50	0.00	0.00	...	262.5	5.2	5.0	16	2.59	1.49
70.0	.749	7.9	4.6	62.9	507.4	12.75	17.50	0.75	0.00	0.00	...	216.0	5.2	4.9	21	2.87	1.34
73.3	.822	8.7	4.0	68.4	506.0	9.00	17.50	4.25	0.25	0.00	...	164.4	5.8	4.3	25	6.36	4.58
72.6	.803	8.6	4.2	66.8	506.2	8.50	19.00	2.50	0.00	0.00	...	146.2	6.2	5.2	20	5.74	3.97
72.2	.789	8.4	4.0	68.0	506.5	5.75	18.50	6.75	0.00	0.00	...	147.3	6.1	5.6	20	4.45	3.03
70.8	.753	8.0	4.2	65.8	506.9	10.00	16.60	3.50	0.00	0.00	...	156.6	5.1	5.4	19	3.08	1.61
68.2	.692	7.4	4.3	62.9	510.1	12.75	18.25	0.00	0.00	0.00	...	213.2	5.2	6.0	21	3.06	1.31
69.2	.719	7.6	4.5	62.5	509.1	129.75	216.50	18.50	0.25	0.00	...	188.4	4.9	4.9	204	35.15	20.44

Long. 76° 42' W. Height above Sea 3,800 feet.

58.4	.480	5.4	1.9	74.5	...	6.75	8.25	0.00	0.00	16.00	...	...	1.2	5.9	14	2.97	...
59.2	.500	5.6	1.5	78.0	...	7.00	7.50	0.00	0.00	13.50	...	...	1.1	5.2	11	2.53	...
59.3	.505	5.5	1.9	75.0	...	10.60	13.00	0.00	0.00	7.50	...	...	1.0	5.0	4	2.19	...
61.2	.538	5.9	2.1	74.3	...	7.00	7.50	0.00	1.00	14.80	...	...	1.0	5.7	10	3.74	...
62.2	.560	6.2	1.8	77.0	...	3.75	6.75	0.00	0.00	20.50	...	...	0.6	5.7	16	6.80	...
62.4	.566	6.1	2.5	71.2	...	1.60	6.60	0.00	0.00	22.00	...	...	0.4	5.9	6	6.52	...
61.9	.556	6.0	2.2	73.4	...	3.25	6.75	0.00	0.50	30.80	...	...	0.8	5.5	14	3.95	...
62.7	.573	6.2	2.4	71.9	...	2.25	3.25	0.00	0.50	25.00	...	...	3.9	5.3	10	7.43	...
60.7	.533	5.7	2.8	66.6	...	3.00	5.00	0.00	0.00	22.00	...	...	5.0	5.5	8	11.15	...
63.5	.586	6.4	1.5	80.0	...	3.75	6.75	0.00	0.00	30.50	...	...	0.6	5.4	21	13.00	...
...
...
...
61.1	.540	5.9	2.1	74.1	...	48.75	71.25	0.00	2.00	182.00	...	...	1.6	5.5	114	60.58	...

* Rain and Snow.

† Frozen.

‡ 32 ft. above the ground.

§ No Papers.

Appendix

BERMUDA.

Lat. 32° 22' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean.				Maximum in Sun's rays.	Minimum on grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January ...	30.037	30.383	29.633	77.0	46.0	31.0	70.9	58.0	12.9	64.4	120.7	47.6	65.9	60.5
February ...	30.008	30.307	29.674	77.2	50.8	26.4	71.0	58.9	14.1	63.9	126.4	45.7	65.2	59.1
March ...	30.009	30.300	29.615	79.0	50.0	29.0	72.7	58.1	14.6	65.4	133.6	48.0	69.0	61.4
April* ...	29.568	30.148	29.490	80.0	52.0	28.0	75.4	60.2	15.2	67.8	135.1	51.3	71.4	63.4
May† ...	29.984	30.149	29.776	90.8	62.5	28.3	87.1	70.1	17.0	78.6	149.4	63.3	82.7	76.1
June ...	30.006	30.124	29.844	95.0	69.0	26.0	90.3	72.1	18.2	81.2	155.0	65.3	85.7	75.9
July ...	29.999	30.164	29.824	95.2	69.0	26.2	90.8	72.6	18.2	81.7	153.2	65.1	85.8	77.9
August ...	29.909	30.049	29.647	97.0	62.5	34.5	89.3	70.9	18.4	80.1	138.3	64.9	84.2	77.6
September ...	29.998	30.200	29.733	87.8	59.5	28.3	81.0	66.2	14.8	73.6	123.5	57.0	76.7	69.2
October ...	29.828	30.108	29.494	81.0	49.0	32.0	73.9	59.8	14.1	66.8	104.1	51.1	69.7	62.4
November ...	33.045	30.478	29.926	79.8	47.0	32.8	74.1	59.0	15.1	66.5	91.5	49.8	67.8	62.1
December ...	29.945	30.219	29.605	85.4	56.1	29.3	79.7	64.0	15.7	71.8	130.3	55.4	74.9	62.5
Sums, Means, and Totals ...	29.945	30.219	29.605	85.4	56.1	29.3	79.7	64.0	15.7	71.8	130.3	55.4	74.9	62.5

Abstract of Results of Meteorological Observations

Stations, with their Height above the Sea.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and cor- rected to 32°.	Lowest reduced and cor- rected to 32°.	Highest during Year.	Lowest during Year.	Range during Year.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
Halifax, N.S. ... 125 ft.	29.722	30.531	28.852	88.0	-4.0	92.0	53.1	32.4	20.7	42.7	92.4	...	45.2	41.3
Barbados 25 ..	29.977	30.191	29.784	92.5	66.0	26.5	87.4	73.6	13.8	80.5	142.4	69.9	83.3	74.5
†Newcastle, Jamaica ... } 3,800 ..	...	...	...	95.0	45.0	50.0	80.0	56.6	23.4	68.3	137.0	50.9	69.8	64.9
§Up Park Camp, Jamaica ... } 225 ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
§Nassau, Bahamas 44 ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
‡Bermuda 61 ..	29.945	30.478	28.926	97.0	46.0	51.0	79.7	64.0	15.7	71.8	130.3	55.4	74.9	62.5

* Observations extend over 24 days only, owing to instrument shifting.

† No observations, from same cause.

‡ Observations from 1st January to 31st October.

§ Too incomplete to summarize.

|| Observations not taken from 25th April to 31st May, owing to instrument shifting.

No. XVII—continued.

Long. 64° 40' W. Height above Sea 61 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pressure of Wind.	Mean daily Horizontal Movement of the Air.				On the Ground.	20 Feet above the Ground.
56.1	.452	5.0	2.0	71.0	527.9	9.50	7.00	5.00	5.50	4.00	lbs. per sq. foot	Miles				inches	inches
54.0	.418	4.6	2.4	66.3	527.8	8.50	3.50	5.00	10.00	1.00	...	...	5.4	3.9	9	1.59	1.19
55.5	.441	4.8	2.7	64.0	525.5	9.00	5.50	7.50	9.00	0.00	...	...	5.4	3.6	6	1.51	1.16
60.8	.535	5.8	2.6	69.0	519.1	5.00	1.50	4.00	13.30	0.00	...	...	5.9	3.6	6	1.59	1.37
...	...	...	...	...	...	...	...	...	...	...	...	...	6.0	3.9	8	3.23	3.13
71.7	.776	8.3	3.6	69.7	508.8	3.50	1.00	9.50	14.00	2.00	...	...	...	...	...	2.77	2.23
73.0	.813	8.6	4.5	65.9	506.0	2.00	1.50	16.50	11.00	0.00	...	...	...	...	...	leaky.	4.04
72.8	.807	8.5	4.6	65.2	505.9	1.50	6.50	11.50	9.50	2.00	...	...	...	...	...	3.10	3.10
72.5	.797	8.4	3.3	68.8	506.3	3.50	5.00	10.50	9.00	2.00	...	...	...	...	...	5.04	4.35
63.9	.595	6.4	3.7	65.0	515.8	6.00	11.00	3.00	5.00	6.00	...	...	...	...	...	3.82	3.25
57.6	.476	5.2	2.7	84.8	520.0	11.50	5.00	3.00	8.50	2.00	...	...	...	...	...	7.05	3.99
59.6	.511	5.5	1.9	75.0	525.8	4.00	2.00	7.50	7.50	10.00	...	...	...	...	...	6.26	5.28
63.4	.602	6.5	3.1	67.7	517.2	64.00	49.50	83.00	102.50	29.00	...	...	5.3	3.2	117	...	33.09
328 days only.																	

taken at Stations in North America and the West Indies, in the Year 1871.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.												
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Rain fall on the Ground.	Latitude.	Longitude.
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hori- zontal Movement of the Air.						
36.8	.254	2.9	1.1	72.2	546.2	84.50	21.0	80.50	147.00	1.00	lbs. per sq. foot ...	Miles ...	7.2	3.1	139	48.55	44 39 N.	63 36 W.
69.2	.719	7.6	4.5	62.5	508.1	129.75	216.50	18.50	0.25	0.00	..	188.4	4.9	4.9	204	35.15	13 4 ..	59 40 ..
61.1	.540	5.9	2.1	74.1	...	48.75	71.25	0.00	2.00	182.00	...	...	1.5	5.5	114	60.58	18 6 ..	76 42 ..
...
...
53.4	.602	6.5	3.1	67.7	517.2	64.00	49.50	83.00	102.50	29.00	...	162.0	5.3	3.2	117	38.06	32 22 ..	64 40 ..

Appendix

Abstract of Results of Meteorological Observations

COLOMBO, CEYLON.

Lat. 6° 56' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Dry Bulb.	Wet Bulb.
January ...	29.852	29.939	29.735	96.2	69.8	26.4	89.4	74.6	14.8	82.0	...	...	83.3	79.3
February ...	29.876	29.964	29.794	94.0	68.0	26.0	90.8	70.5	20.3	80.6	...	...	84.1	75.1
March ...	29.865	29.999	29.755	97.4	63.4	34.0	92.1	69.2	22.9	80.6	...	...	83.9	79.4
April ...	29.841	30.008	29.695	97.0	70.5	26.5	93.9	74.4	19.5	84.1	...	...	87.2	80.2
May ...	29.808	29.934	29.796	93.6	70.0	23.6	86.1	74.7	11.4	80.4	146.9	...	83.0	79.0
June ...	29.849	30.783	28.886	92.4	70.0	22.4	89.7	75.6	14.1	82.6	143.2	...	85.2	79.3
July ...	29.841	29.889	29.694	97.6	64.5	33.1	91.5	72.0	19.5	81.7	141.6	...	83.6	79.8
August ...	29.880	29.978	29.742	93.6	68.7	24.9	91.1	73.1	18.0	82.1	142.0	...	83.4	79.2
September ...	29.849	29.924	29.772	94.6	72.0	22.6	91.1	75.4	15.7	83.2	...	...	84.5	78.2
October ...	29.864	29.913	29.771	92.6	68.4	24.2	90.5	70.9	19.6	80.7	...	...	83.4	79.2
November ...	29.854	29.948	29.771	9.3	64.7	28.6	91.0	70.2	20.8	80.6	...	...	84.0	79.2
December ...	29.893	29.961	29.804	9.6	68.3	23.3	89.5	71.1	18.4	80.3	...	...	83.0	78.6
Sums, Means, and Totals ...	29.855	30.029	29.768	94.5	68.2	26.3	90.6	72.6	18.0	81.6	...	...	84.0	78.6

KANDI, CEYLON.

Lat. 7° 18' N.

January ...	...	...	...	99.2	56.0	43.2	88.8	61.2	27.6	75.0	...	...	76.9	71.9
February ...	...	...	...	98.0	46.0	52.0	96.3	59.0	36.3	77.1	...	...	81.3	72.1
March ...	...	...	...	103.5	56.5	47.0	95.9	61.9	34.0	78.9	...	...	83.4	73.7
April ...	...	...	...	108.2	62.0	46.2	98.1	64.8	33.3	84.4	...	...	84.2	76.9
May ...	...	...	...	102.8	62.0	40.8	93.6	64.9	28.7	79.2	...	...	82.8	76.0
June ...	...	...	...	96.0	63.0	32.0	87.2	65.7	21.5	76.4	...	...	77.4	73.2
July ...	...	...	...	91.5	59.0	32.5	84.0	63.8	20.2	73.9	...	...	75.5	72.0
August ...	...	...	...	104.0	58.6	45.4	90.9	64.8	26.1	77.8	...	...	79.6	73.7
September ...	...	...	...	99.0	56.4	42.6	89.5	63.6	25.9	76.5	...	...	79.7	73.3
October ...	...	...	...	104.8	55.6	49.2	94.9	62.3	32.6	78.6	...	...	81.3	74.9
November ...	...	...	...	99.0	61.2	37.8	89.9	63.6	26.3	76.7	...	...	78.2	73.6
December ...	...	...	...	94.0	59.6	34.4	87.9	62.5	25.4	75.2	...	...	77.5	72.0
Yearly Sums, Means, and Totals ...	...	...	...	99.9	58.0	41.9	91.3	63.2	29.1	77.2	...	...	79.8	73.5

NEWERA ELIA, CEYLON.

Lat. 6° 48' N.

January ...	...	...	...	81.0	20.0	61.0	73.8	40.6	33.2	57.2	130.7	34.1	64.0	58.1
February ...	...	...	...	83.0	16.0	67.0	79.1	32.5	46.6	56.8	139.8	23.6	67.9	57.3
March ...	...	...	...	84.0	25.0	59.0	78.4	37.9	40.5	58.1	138.2	23.8	66.8	58.7
April ...	...	...	...	83.0	31.0	52.0	79.3	41.4	37.9	60.3	139.8	30.6	66.5	60.5
May ...	...	...	...	83.0	40.0	43.0	74.8	48.5	26.3	61.6	132.8	37.9	65.8	60.5
June ...	...	...	...	78.0	46.0	32.0	70.7	49.0	21.7	59.8	130.5	40.0	62.4	58.8
July ...	...	...	...	77.0	35.0	42.0	70.5	48.0	22.5	59.2	126.0	37.0	61.3	58.6
August ...	...	...	...	81.0	38.0	43.0	72.9	42.1	30.8	57.5	137.7	32.8	63.6	58.8
September ...	...	...	...	77.0	36.0	41.0	71.9	43.1	28.8	57.5	123.8	33.5	62.5	58.6
October ...	...	...	...	78.0	34.0	44.0	73.8	40.6	33.2	57.2	131.1	32.3	62.8	58.6
November ...	...	...	...	76.0	33.0	43.0	71.8	40.9	30.8	56.3	124.1	...	62.6	59.1
December ...	...	...	...	80.0	26.0	54.0	72.4	36.8	26.6	54.6	130.2	...	62.0	54.0
Yearly Sums, Means, and Totals ...	...	...	...	80.1	31.7	48.4	74.1	41.8	32.3	57.9	132.1	...	64.9	58.6

* No Instruments.

† Broken.

No. XVII—continued.

taken at Stations in the Island of Ceylon, in the Year 1871.

Long. 79° 49' E. Height above Sea 18 feet.

Hygrometrical Results from Glashier's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hor- izontal movement of the Air.				On the Ground.	18 Ground.
											lbs. per sq. foot.	Miles.				Inches	Inches
76.8	.915	9.8	2.3	80.3	505.1	20.75	0.25	1.25	8.75	0.00	...	...	7.8	8.8	12	*	6.50
69.2	.713	7.5	4.9	60.1	506.0	6.75	13.00	6.50	0.75	1.00	...	...	1.7	5.3	9	*	2.83
76.4	.909	9.7	2.6	78.4	504.7	1.25	7.25	10.25	12.25	0.00	...	...	3.8	5.2	14	*	6.90
75.7	.890	9.4	4.3	69.0	501.6	0.50	2.75	13.50	13.25	0.00	...	...	5.0	5.0	14	*	†
76.3	.905	9.7	2.3	80.0	504.6	0.00	0.50	17.50	13.00	0.00	...	...	5.2	5.4	19	8.14	6.86
75.5	.884	9.3	3.6	72.4	503.2	0.00	0.00	15.25	14.75	0.00	...	...	5.8	5.4	13	3.81	2.17
77.3	.935	10.0	2.3	81.6	504.5	0.00	3.00	17.00	11.00	0.00	...	...	6.2	5.7	18	8.04	7.51
76.4	.908	9.7	2.4	79.4	505.5	0.00	0.00	18.75	12.25	0.00	...	...	5.5	5.7	13	3.20	1.42
74.5	.843	8.9	3.7	70.8	504.4	0.00	0.00	17.75	12.25	0.00	...	...	3.1	5.4	11	4.51	3.49
70.1	.898	9.6	2.5	78.4	505.2	0.00	0.00	3.50	27.50	0.00	...	...	4.5	5.7	22	8.25	6.72
75.5	.882	9.3	3.2	74.4	504.3	14.75	2.00	0.00	12.75	0.50	...	...	4.0	5.5	20	10.15	8.89
75.7	.885	9.4	2.5	78.4	506.1	20.00	9.25	0.00	1.25	0.50	...	...	4.2	5.6	14	5.08	4.16
75.4	.847	9.3	3.0	75.3	504.6	64.00	38.00	121.25	139.75	2.00	...	...	4.7	6.6	179	...	...

Long. 80° 48' E. Height above Sea 1,678 feet.

68.3	.692	7.5	2.5	74.6	...	13.75	13.75	0.00	0.00	3.50	...	...	5.8	5.6	12	15.15	...
65.9	.637	6.8	4.6	59.5	...	11.00	11.00	0.00	0.00	6.00	...	...	2.7	4.8	6	2.85	...
67.2	.668	7.1	5.1	57.9	...	5.50	6.50	3.75	2.75	12.50	...	...	3.7	3.6	4	2.85	...
72.1	.787	8.4	4.1	67.0	...	4.25	0.75	3.50	12.50	9.00	...	...	5.4	5.1	19	9.24	...
71.5	.770	8.2	3.7	68.8	...	2.50	0.00	4.75	21.25	2.50	...	...	6.0	6.0	14	2.10	...
70.3	.741	8.0	2.1	78.4	...	1.50	0.00	6.75	21.75	0.00	...	...	7.2	7.4	26	8.12	...
69.4	.722	7.8	1.7	81.5	...	3.00	0.00	10.25	17.75	0.00	...	...	7.3	7.1	24	15.14	...
69.7	.726	7.8	3.1	71.4	...	3.25	0.00	4.75	21.50	1.50	...	...	6.4	5.7	19	3.59	...
68.9	.708	7.6	3.3	69.4	...	6.00	0.00	1.75	22.25	0.00	...	...	6.2	4.9	18	3.22	...
69.0	.708	7.5	3.9	66.0	...	3.50	0.00	4.75	20.75	2.00	...	...	5.3	3.4	16	9.02	...
70.7	.753	8.1	2.3	77.4	...	7.50	5.00	7.50	8.00	2.00	...	...	6.2	5.1	28	12.20	...
68.1	.689	7.4	2.7	73.0	...	1.75	14.50	14.25	0.50	0.00	...	...	5.4	6.9	12	3.56	...
69.2	.713	7.7	3.2	70.4	...	63.50	51.50	62.00	149.00	39.00	...	...	5.6	5.6	198	87.04	...

Long. 80° 48' E. Height above Sea 6,200 feet.

53.2	.406	4.5	2.1	67.5	...	14.00	15.25	0.75	1.00	...	...	...	6.2	7.0	21	21.82	...
49.0	.348	3.8	3.6	50.0	...	13.75	13.25	0.25	0.75	...	...	...	2.8	7.2	7	1.69	...
52.2	.391	4.3	2.9	60.4	...	12.75	17.25	0.25	0.75	...	...	...	4.4	7.3	11	3.62	...
56.7	.443	6.7	0.4	94.0	...	14.75	15.25	0.00	0.00	...	...	...	4.1	6.8	16	7.76	...
56.2	.453	5.0	1.9	71.5	...	10.25	5.50	0.75	14.50	...	...	...	4.6	6.4	17	6.89	...
55.7	.445	5.0	1.3	79.0	...	2.00	2.00	0.00	26.00	...	...	...	5.6	6.7	21	10.60	...
56.3	.456	5.1	1.0	84.1	...	0.00	0.00	1.50	29.50	...	...	...	5.6	+	24	17.05	...
54.8	.431	4.8	1.7	73.6	...	4.50	4.50	0.25	21.75	...	...	...	4.2	+	19	4.70	...
55.3	.438	4.9	1.4	77.5	...	0.75	0.75	2.50	26.00	...	...	...	4.8	+	19	4.94	...
55.0	.434	4.9	1.5	78.0	...	4.00	2.75	6.00	18.25	...	...	...	3.6	7.4	19	5.61	...
56.1	.451	5.1	1.3	79.6	...	13.00	12.50	0.50	4.00	...	...	...	4.5	7.5	24	9.89	...
54.6	.427	4.7	1.5	77.0	...	14.75	15.50	0.75	0.00	...	...	...	3.3	7.3	18	7.07	...
54.6	.427	4.9	1.7	74.2	...	104.50	104.50	13.50	142.50	...	...	...	4.4	...	216	101.44	...

* Instrument useless.

† Useless.

‡ No papers.

Appendix

TRINCOMALEE, CEYLON.

Lat. 8° 30' N.

Month.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	94.2	63.8	30.4	87.6	69.5	18.1	78.5	...	...	81.0	75.4
February	95.2	62.0	33.2	90.2	68.3	21.9	79.2	...	...	83.5	76.1
March	95.4	66.8	28.6	92.6	71.1	21.5	81.8	...	...	85.5	78.9
April	102.2	70.4	31.8	96.5	72.9	23.6	84.7	...	...	88.9	81.1
May	102.2	68.2	34.2	98.8	73.3	25.5	86.0	...	...	90.1	83.1
June	102.0	72.3	29.8	99.7	74.4	25.3	87.6	...	...	90.3	83.4
July	104.2	68.2	36.0	100.0	72.3	27.7	86.1	...	...	91.3	84.0
August	104.0	68.2	35.8	100.1	71.3	28.8	85.7	...	...	92.4	84.9
September	105.8	65.2	40.6	99.3	71.0	28.3	85.1	...	...	92.5	84.9
October...	104.0	67.0	72.0	96.0	70.1	25.9	83.0	...	...	91.3	84.1
November	100.2	65.0	35.2	91.3	71.3	20.0	81.3	...	...	81.9	77.3
December	96.4	65.0	31.4	90.3	70.5	19.8	80.4	...	...	82.9	75.3
Yearly Sum, Means, and Totals	100.5	66.8	33.7	96.2	71.3	23.9	83.2	...	...	90.2	79.4

Abstract of Results of Meteorological Observations

Stations, with their Height above the Sea.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of				
	Mean reduced and corrected to 32°.	Highest reduced and cor- rected to 32°.	Lowest reduced and cor- rected to 32°.	Highest during Year.	Lowest during Year.	Range during Year.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.		
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.	
Colombo ... 18 ft.	29.855	30.783	29.886	97.4	63.4	34.0	90.6	72.6	18.0	81.6	...	...	84.0	73.3
Kandi ... 1,678 „	84.0	16.0	68.0	74.1	41.8	32.3	57.9	132.1	64.0	58.6
Trincomalee 25 „	105.8	62.0	43.8	95.2	71.3	23.9	83.2	90.2	73.1
Newera Ellia 6,200 „	108.2	46.0	62.2	91.3	63.2	28.1	77.2	79.6	73.3

No. XVII—continued.

Long. 82° 0' E. Height above the Sea 25 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.											
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pre- sure of Wind.	Mean daily Hor- izontal Movement of the Air.				On the Ground.	Feet above the Ground.
72.3	.793	8.5	2.8	75.2	...	15.25	15.50	0.25	0.00	0.00	lbs. per sq. foot	Miles	6.0	6.3	18	26.74	Inches
72.2	.789	8.4	3.8	68.8	...	11.50	14.00	2.50	0.00	0.00	...	...	4.7	5.3	10	3.94	...
74.6	.859	9.0	3.9	70.1	...	12.75	16.50	2.75	0.00	0.00	...	...	4.5	5.6	5	2.52	...
76.1	.902	9.5	4.9	66.7	...	12.00	17.00	1.00	0.00	0.00	...	...	5.0	4.6	4	0.64	...
77.3	.938	9.8	5.0	65.5	...	3.50	7.75	12.00	7.75	0.00	...	...	4.9	4.2	6	3.33	...
79.1	.997	10.4	4.5	69.7	...	0.00	0.00	15.00	15.00	0.00	...	...	5.5	3.6	0	0.00	...
75.1	.871	9.2	4.7	66.2	...	0.00	0.00	15.50	15.50	0.00	...	...	6.1	4.9	3	0.86	...
74.5	.853	9.0	5.2	63.4	...	0.00	0.00	15.50	15.50	0.00	...	...	5.8	4.4	6	2.26	...
74.3	.847	8.9	5.3	62.7	...	0.00	0.00	15.00	15.00	0.00	...	...	3.8	4.0	11	8.96	...
74.0	.841	8.9	3.6	71.2	...	5.50	8.50	9.50	7.50	0.00	...	...	4.3	2.7	18	10.35	...
74.2	.846	9.0	2.6	77.9	...	11.00	11.00	5.00	3.00	0.00	...	...	5.1	5.3	22	17.58	...
71.5	.773	8.3	3.5	70.4	...	15.50	15.50	0.00	0.00	0.00	...	...	4.6	5.1	16	13.35	...
74.6	.859	9.1	4.1	68.9	...	87.00	104.75	94.00	79.25	0.00	...	...	5.0	4.7	120	90.53	...

taken at Stations in the Island of Ceylon, in the Year 1871.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.												
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of Calm, or nearly calm, Days.	Calculated from Robinson's Anemometer		Amount of Cloud 0-10.	Ozone Scale 0-10.	Number of Days on which Rain fell.	Rain fall on the Ground.	Latitude.	Longitude.
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pres- sure of Wind.	Mean daily Hor- izontal Movement of the Air.						
75.4	.847	9.3	3.0	75.3	604.6	64.00	38.00	121.25	139.75	2.00	lbs. per sq. foot.	Miles	4.7	6.6	179	Inches *	6 56 N.	79 49 E
74.6	.859	9.1	4.1	68.9	...	87.00	104.75	94.00	79.25	0.00	...	...	5.0	4.7	120	90.53	6 30 "	32 0 "
54.6	.427	4.9	1.7	74.2	...	104.50	104.50	13.50	142.50	0.00	...	...	4.4	...	216	101.44	6 48 "	80 48 "
69.2	.713	7.7	3.2	70.4	...	63.50	81.50	62.00	49.00	39.00	...	...	5.6	5.6	198	87.04	7 18 "	80 48 "

* Instruments useless.

Appendix

Abstract of Results of Meteorological Observations

GIBRALTAR.

Lat. 36° 6' N.

Month	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and corrected to 32°.	Lowest reduced and corrected to 32°.	Highest during Month.	Lowest during Month.	Range during Month.	Mean				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
January	50.062	30.370	29.596	62.0	33.0	29.0	56.5	40.9	15.6	48.7	80.0	30.7	51.9	47.9
February	30.199	30.498	29.884	69.0	43.0	26.0	62.8	47.1	15.7	54.9	84.5	37.2	57.0	54.0
March	30.036	30.383	29.694	71.5	44.0	27.5	63.8	49.4	14.4	56.6	89.5	40.0	59.5	55.5
April	30.026	30.192	29.817	84.0	48.0	36.0	73.2	53.2	20.0	63.2	113.8	43.6	67.2	61.7
May	30.898	30.115	29.616	79.0	53.0	26.0	73.4	56.9	16.5	65.1	109.3	48.0	67.1	62.2
June	30.010	30.161	29.885	90.0	52.0	38.0	79.5	58.7	20.8	69.1	122.9	49.5	72.2	65.9
July	30.006	30.200	29.793	94.0	57.0	37.0	86.3	64.7	21.6	75.5	129.9	55.6	78.2	71.4
August	30.025	30.130	29.940	91.0	63.0	28.0	84.0	69.1	14.9	76.6	118.4	57.4	77.3	72.6
September	29.985	30.135	29.826	85.0	59.0	26.0	79.6	65.9	13.7	72.7	111.2	50.9	73.3	69.0
October	29.962	30.154	29.549	95.0	52.0	43.0	74.7	60.6	14.1	67.6	96.9	44.7	68.9	64.4
November	29.930	30.172	29.582	49.0	44.0	25.0	64.7	53.7	11.0	59.2	85.2	37.6	60.2	57.1
December	30.027	30.469	29.566	67.0	44.0	23.0	58.4	50.4	8.0	54.4	72.8	31.5	54.7	51.5
Yearly Sums, Means, and Totals	30.014	30.248	29.724	79.7	49.3	30.4	71.4	55.9	15.5	63.6	101.3	45.8	65.7	61.2

MALTA.

Lat. 30° 35' N.

January ...	29.705	30.088	29.122	63.0	45.0	18.0	59.2	50.6	8.6	59.8	108.2	38.4	56.4	51.1
February ...	30.005	30.386	29.442	64.4	48.0	16.4	60.2	51.2	9.0	55.7	119.2	34.4	57.4	52.3
March ...	29.923	30.296	29.429	68.0	48.0	20.0	61.6	52.2	9.4	56.9	122.1	35.8	59.1	53.3
April ...	29.839	30.101	29.587	78.0	48.4	29.6	67.4	56.8	10.6	62.1	123.6	42.0	64.5	58.6
May ...	29.803	29.969	29.506	89.0	58.0	31.0	72.8	62.2	10.6	67.5	128.2	47.9	69.7	62.3
June ...	29.817	29.953	29.558	83.0	64.2	18.8	77.4	67.2	10.2	72.3	131.8	52.4	74.4	66.6
July ...	29.809	29.837	29.592	96.4	67.0	29.4	85.4	72.6	12.8	79.0	138.3	56.9	81.4	71.6
August ...	29.847	30.081	29.737	90.4	68.4	22.0	83.8	73.9	9.9	78.8	139.3	58.7	80.9	72.9
September ...	29.889	30.107	29.733	93.0	70.4	22.6	83.5	73.2	10.3	78.3	138.7	58.5	80.7	72.4
October ...	29.815	30.033	29.499	82.4	59.0	23.4	77.9	68.3	9.6	73.1	133.6	51.8	75.1	67.7
November ...	29.701	29.949	29.472	76.0	50.0	26.0	68.6	60.1	8.5	64.3	119.9	42.1	65.8	60.0
December ...	29.809	30.120	29.375	71.0	46.6	24.4	60.3	52.3	8.0	56.3	110.5	42.7	57.7	53.1
Yearly Sums, Means, and Totals ...	29.830	30.085	29.504	80.4	56.1	24.3	71.5	61.7	9.8	67.0	126.3	46.4	68.6	61.9

SCUTARI.

Lat. 41° 0' N.

January ...	29.944	30.230	29.396	61.4	26.6	34.8	51.4	40.0	11.4	45.7	73.3	33.3	47.1	44.3
February ...	30.096	30.455	29.743	61.0	25.2	35.8	47.8	35.2	12.6	41.5	86.9	27.3	42.6	40.1
March ...	30.061	30.473	29.566	70.4	26.8	43.6	52.5	38.2	14.3	45.3	95.4	30.7	46.5	43.0
April ...	29.870	30.131	29.621	78.0	36.6	41.4	62.4	44.4	18.0	53.4	106.9	36.2	56.1	51.9
May ...	29.818	29.984	29.510	82.8	39.0	43.8	69.2	51.2	18.0	60.2	115.4	43.9	62.3	57.5
June ...	29.766	30.060	29.460	97.0	55.0	42.0	80.9	59.9	21.0	70.4	127.4	52.5	73.6	66.9
July ...	29.787	29.964	29.562	97.6	58.0	39.6	88.4	65.1	23.3	76.8	134.3	57.8	81.3	72.3
August ...	29.814	30.162	29.615	97.8	54.2	43.6	89.3	66.2	23.1	77.7	134.2	59.3	81.8	72.2
September ...	29.910	30.233	29.661	85.4	50.0	35.4	78.3	58.2	20.1	68.2	123.9	50.5	73.2	65.0
October ...	29.944	30.137	29.432	82.8	44.2	38.6	67.7	54.5	13.2	61.1	103.9	47.4	62.2	58.7
November ...	29.917	30.312	29.544	72.6	41.0	31.6	64.4	50.2	14.2	57.3	94.1	42.5	58.6	54.6
December ...	30.016	30.460	29.459	70.6	29.0	41.6	48.9	38.0	10.9	43.4	67.2	31.4	42.8	41.0
Yearly Sums, Means, and Totals ...	29.830	30.236	29.549	79.8	40.5	39.3	66.8	50.1	16.7	58.4	106.2	42.6	60.8	56.6

* Barometer and Hygrometer for 29 days only.

† Barometer and Hygrometer for 30 days only.

No. XVII—continued.

taken at Stations in the Mediterranean, in the Year 1871.

Long. 5° 20' W. Height above Sea 50 feet.

Hygrometrical Results from Glaisher's Tables (3rd edition).							Atmospherical Conditions.										
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.	In a Cubic Foot of Air.			Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0—10.	Ozone Scale 0—10.	Number of Days on which Rain fell.	Amount of Rain fall.	
		Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.		North.	East.	South.	West.		Mean daily pressure of Wind.	Mean daily Horizontal Movement of the Air.				On the Ground.	25 Feet above the Ground.
											lbs. per sq. foot	Miles				Inches	Inches.
43.9	.288	3.3	1.1	74.9	543.9	9.25	3.25	2.75	15.75	0.00	...	...	2.4	2.3	7	3.55	3.30
51.2	.377	4.2	1.0	81.0	540.5	3.00	11.00	3.75	10.25	0.00	...	...	3.8	2.6	6	1.87	1.72
52.5	.396	4.4	1.3	78.3	534.7	1.75	15.00	5.50	8.75	0.00	...	...	3.9	2.7	11	5.30	4.62
57.3	.472	5.2	2.2	70.5	526.4	3.25	15.25	3.50	8.00	0.00	...	...	1.8	1.9	1	0.15	0.14
59.7	.512	5.5	1.9	75.5	523.4	2.25	12.75	5.25	10.75	0.00	...	...	3.6	2.4	10	4.41	3.91
61.2	.541	5.8	2.7	67.8	520.7	4.00	10.00	1.75	14.25	0.00	...	...	1.7	1.9	5	1.39	1.28
66.7	.655	7.0	3.3	68.0	514.1	4.00	17.00	2.75	7.25	0.00	...	...	1.1	1.7	...	...	...
69.3	.717	7.7	2.3	76.2	514.8	4.50	20.00	3.00	3.50	0.00	...	...	3.5	4.0	...	...	...
65.8	.636	6.9	1.9	77.8	518.6	3.50	6.00	2.00	18.50	0.00	...	...	3.5	5.2	7	3.22	2.95
60.8	.534	5.8	2.0	75.5	523.1	1.75	17.00	1.00	11.25	0.00	...	523.0	4.1	5.0	6	5.18	5.12
54.4	.423	4.7	1.1	81.6	532.0	12.00	1.25	1.25	15.50	0.00	...	694.9	5.7	5.1	14	9.17	8.52
48.4	.334	3.9	1.0	78.8	540.0	9.25	14.00	2.50	5.25	0.00	...	909.7	6.6	5.3	18	7.38	6.72
57.6	.490	5.4	1.8	77.2	527.7	58.50	142.50	35.00	129.00	0.00	...	...	3.4	3.3	85	41.62	38.32

Long. 14° 30' E. Height above Sea 111 feet.

																		\$
46.5	.318	3.5	1.6	69.5	532.6	6.00	2.00	6.25	14.75	2.00	...	136.2	5.8	6.0	20	5.36	5.33	
47.6	.331	3.7	1.6	69.9	536.9	11.00	6.00	2.25	8.25	0.50	...	97.3	4.9	5.0	6	1.00	0.99	
48.2	.336	3.8	1.8	67.1	533.6	7.50	10.50	3.25	4.75	5.00	...	64.9	4.6	6.0	4	0.87	0.88	
53.7	.414	4.6	2.1	68.0	526.1	12.25	5.00	1.75	8.50	2.50	...	76.8	4.6	6.9	4	0.13	0.13	
57.5	.473	5.2	2.8	64.4	520.0	11.00	9.25	4.50	5.25	1.00	...	100.7	4.8	7.0	4	0.15	0.15	
60.9	.536	5.8	3.4	62.8	515.3	13.75	9.25	1.75	5.35	0.00	...	112.5	2.3	6.5	1	...	...
65.0	.617	6.6	4.9	57.2	508.0	15.00	4.25	1.50	9.75	0.50	...	65.1	0.9	4.6	...	...	...
67.5	.674	7.2	3.1	63.9	509.7	14.00	9.75	2.25	4.50	0.50	...	75.0	2.8	4.4	1	1.22	1.20	*
66.7	.657	7.0	4.2	62.5	509.7	11.25	9.00	3.00	6.25	0.50	...	76.4	3.6	4.6	1	*	*	
62.7	.564	6.1	3.4	64.5	514.5	11.00	4.25	4.75	10.50	0.50	...	87.4	4.5	4.7	12	2.35	2.41	
55.3	.437	4.8	2.1	69.0	522.2	7.75	5.25	5.00	9.53	2.50	...	112.9	6.4	5.1	16	2.64	2.66	
48.9	.346	3.9	1.5	72.1	532.9	8.50	7.50	3.75	8.75	2.50	...	144.4	6.6	4.6	19	6.78	6.94	
56.2	.475	5.2	2.7	65.9	521.7	129.00	82.00	40.00	96.00	18.00	...	95.8	4.3	5.5	88	20.00	20.69	

Long. 29° 3' E. Height above Sea 60 feet.

41.2	.259	3.0	0.7	80.5	547.2	11.00	7.25	8.75	1.50	2.50	...	238.9	7.7	6.8	21	4.10	3.41	
37.1	.221	2.6	0.6	81.5	555.1	7.25	6.50	7.50	6.75	0.00	...	271.1	6.5	6.2	9	1.58	0.78	
39.0	.238	2.7	0.9	76.0	550.0	12.00	7.25	6.00	4.75	0.50	...	†	7.3	6.5	17	2.09	1.79	
47.7	.334	3.7	1.3	73.5	535.8	8.75	6.50	8.00	3.75	2.50	...	...	6.0	6.0	9	0.64	0.50	
53.4	.409	4.5	1.7	73.0	528.0	7.50	5.75	9.25	7.00	1.00	...	139.6	6.6	6.2	15	3.77	3.51	
62.0	.568	6.0	2.9	67.2	515.4	6.00	3.00	12.75	7.75	0.00	...	116.2	3.6	5.3	10	0.99	0.86	
66.2	.644	6.9	4.5	60.3	507.6	14.00	11.00	2.25	2.25	0.00	...	146.6	2.6	4.7	3	0.05	0.03	
65.7	.634	6.8	4.8	58.4	507.6	12.00	12.50	3.50	3.00	0.00	...	157.9	3.5	4.6	7	3.00	2.86	
59.0	.590	5.4	3.5	61.4	518.2	8.25	6.00	7.75	7.50	0.00	...	124.9	4.1	5.6	6	4.27	4.02	
55.7	.445	5.0	1.3	79.5	530.0	14.75	10.75	3.25	1.75	0.50	...	162.5	7.4	6.3	17	1.81	1.15	
51.0	.375	4.2	1.3	76.0	533.8	6.00	5.50	8.75	4.75	5.00	...	135.9	7.0	6.5	10	1.91	1.62	
37.7	.226	2.6	0.7	78.4	552.2	11.50	9.75	4.50	3.25	1.50	...	259.6	7.9	7.3	18	5.19	4.64	
51.3	.329	4.4	2.0	72.1	531.7	119.00	91.75	82.25	55.00	13.50	...	...	5.8	6.0	142	28.90	25.24	

361.5 days. ‡

* Slight showers.

† Broken.

‡ The months of March, April May, June, July, September and December being each half a day short.

§ 25 ft. above the ground.

|| 20 ft. above the ground.

Appendix

Abstract of Results of Meteorological Observations

Stations, with their Height above the Sea.	Readings of the Barometer.			Temperature of the Air.							Mean Daily Readings of			
	Mean reduced and corrected to 32°.	Highest reduced and cor- rected to 32°.	Lowest reduced and cor- rected to 32°.	Highest during Year.	Lowest during Year.	Range during Year.	Mean.				Maximum in Sun's rays.	Minimum on Grass.	Hygrometer.	
							Of all the highest.	Of all the lowest.	Daily Range.	Approximate Temperature.			Dry Bulb.	Wet Bulb.
Gibraltar ... 50 feet	30·014	30·498	29·549	96·0	33·0	62·0	71·4	55·9	15·5	63·6	101·3	45·8	65·7	61·2
Malta ... 111 „	29·830	30·386	29·122	96·4	45·0	51·4	71·5	61·7	9·8	67·0	126·3	46·4	68·6	61·9
Scutari ... 60 „	29·830	30·473	29·366	97·8	25·2	72·6	66·8	50·1	16·7	58·4	106·2	42·6	60·8	55·4

No. XVII—*continued*.

taken at Stations in the Mediterranean, in the Year 1871.

Hygrometrical Results from Glaisher's Tables (3rd edition).						Atmospherical Conditions.													
Mean Temperature of Dew Point.	Mean elastic Force of Vapour.		In a Cubic Foot of Air.		Mean Weight of Cubic Foot of Air.	Number of Days for mean Direction of Wind.				Number of calm, or nearly calm, Days.	Calculated from Robinson's Anemometer.		Amount of Cloud 0-10.	Ozone Scale 0-10.	Number of Days on which Rain fell.	Rain fall on the Ground.	Latitude.	Longitude.	
	Mean Weight of Vapour.	Mean additional Weight required for Saturation.	Mean Degree of Humidity.	North.		East.	South.	West.	Mean daily pres- sure of Wind.		Mean daily Hori- zontal Movement of the Air.								
57·6	·490	5·4	1·8	77·2	527·7	58·50	142·50	35·00	129·00	0·00	lbs. per sq. foot	Miles	3·4	3·3	85	Inches 41·62	36	6 N.	5 20 W.
56·2	·475	5·2	2·7	65·9	520·1	129·00	82·00	40·00	96·00	18·00	..	95·8	4·3	5·5	88	20·60	80 35,,	14 30 E.	
51·3	·329	4·4	2·0	72·1	531·7	119·00	91·75	82·25	55·00	13·50	5·8	6·0	142	28·90	41 0,,	29 3,,	

* 3½ days short.

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